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# METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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C. Cumulative, annotated bibliographies on subjects of immediate and special interest to meteorologists.

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# METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 1 JUNE 1950 No. 6

## SPECIAL FEATURES IN THIS ISSUE

A Selective Annotated Bibliography on Volcanic Dust

CUMULATIVE AUTHOR AND SUBJECT INDEXES
(Vol. 1, No's. 1-6)

*(For complete table of contents see back cover)*

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# FOREWORD

Each issue of Meteorological Abstracts and Bibliography consists of four parts, as can be seen in the table of contents on the back cover.

Part I comprises 100 to 200 classified and annotated references to current material in the field of *Meteorology* and other fields immediately applicable to *Meteorology*.

In addition, the first issue (Vol. 1, No. 1) contained a **Review of 30 Current Meteorological Periodicals,** and the second issue a **Review of 15 Meteorological Periodicals which have lapsed.**

Part II of each issue provides a means of accumulating the important references on given subjects without respect to recency. It is impossible to make these bibliographies exhaustive under present personnel, time and printing limitations; but every attempt is made to include a representative cross section of the various aspects of each subject, some preference being given to recent material, comprehensive works, those from obscure sources and those with good bibliographies.

Selective, annotated bibliographies consisting of from 50 to 300 items each, have been printed in the issues of Meteorological Abstracts and Bibliography, as follows:

(1) **Atmospheric Pollution,** Vol. 1, No. 1, Jan. 1950
(2) **Aerobiology,** Vol. 1, No. 2, Feb. 1950
(3) **Cloud Physics and "Rain Making,"** Vol. 1, No. 3, March 1950
(4) **Hail,** Vol. 1, No. 4, April 1950
(5) **Tornadoes,** Vol. 1, No. 5, May 1950
(6) **Volcanic Dust,** Vol. 1, No. 6, June 1950

Future issues will contain:

(7) **Climatic Changes,** Vol. 1, No. 7, July 1950
(8) **Thunderstorms,** Vol. 1, No. 8, August 1950
(9) **Icing,** Vol. 1, No. 9, September 1950

In Part III the contents of those journals which are primarily meteorological are listed and published in the earliest issue where space permits. These entries are not classified or indexed.

Part IV consists of author, subject and geographical indexes. The subject and geographical indexes are made up, as a rule, from the subject headings which follow each entry.

In this issue, less space than usual is devoted to Parts I and II in order to leave enough space for **cumulative author, subject, geographical and journal indexes** for the first six issues. These indexes will help materially in the integration of the large number (over 2,000) of bibliographic entries and abstracts which have been printed in this journal.

A **collected list of subject headings** (page 409) will aid the research worker to find the exact terms which are used in the subject index and possible related subjects. This list is furnished as a substitute for numerous *see also* references.

The **list of journals** (page 416) gives some idea of the extent of subject and language coverage.

# LIST OF PERIODICALS

**Note:** In this list the preferred form of title for entry is given in bold face type. If the title is distinctive, the name and headquarters of the issuing society or organization follows the title. If the title is not distinctive the issuing organization precedes and is part of the title.

## PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

**Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.,** [Moscow].
**American Geophysical Union, Transactions,** National Research Council, Washington.
★**American Meteorological Society, Bulletin,** [Boston].
★**Annalen der Meteorologie,** Meteorologisches Amt für Nordwestdeutschland, Hamburg.
**Annali di Geofisica,** Istituto Nazionale di Geofisica, [Rome].
**Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B,** [Vienna].
**Ciel et Terre,** Société Belge d'Astronomie, de Météorologie et de Physique du Globe. Uccle-Bruxelles.
**Geofisica Pura e Applicata,** Istituto Geofisica Italiano, [Milan].
**Geophysical Magazine,** [Central Meteorological Observatory, Toyko].
**Hemel en Dampkring,** Nederlandse Vereniging voor Weer- en Sterrenkunde, [The Hague].
★**Időjárás,** Az Országos Meteorológiai és Földmágnességi Intézet, [Budapest].
★**Indian Journal of Meteorology and Geophysics,** [Delhi].
**Journal of Geophysical Research** (formerly Terrestrial Magnetism and Atmospheric Electricity), [Washington].
★**Journal of Meteorology,** American Meteorological Society, [Boston].
★**Journal Scientifique de la Météorologie,** Société Météorologique de France, [Paris].
★**The Marine Observer,** Air Ministry, Meteorological Office, London.
★**The Meteorological Magazine,** Air Ministry, Meteorological Office, London.
★**Meteorological Society of Japan, Journal,** Second Series, Kisho Shushi, [Tokyo].
★**Meteorologické Zprávy,** Státní Meteorologický ústav v Praze, [Prague].
★**La Météorologie,** Société Météorologique de France, [Paris].
★**Meteorologische Rundschau,** Bad-Kissingen, [U. S. Zone, Germany].
★**Monthly Weather Review,** U. S. Weather Bureau, Washington, D. C.
★**Nimbus,** Sociedad Meteorológica de Bolivia, [La Paz].
**Polarforschung,** Archiv für Polarforschung in Kiel, [Kiel, British Zone, Germany].
★**Revista Meteorológica,** Junta Nacional de Meteorología, Montevideo.
★**Rivista di Meteorologia Aeronautica,** Associazione Culturale Aeronautica, [Rome].
★**Royal Meteorological Society, Quarterly Journal,** [London].
★**Tellus,** Svenska Geofysiska Föreningen, Stockholm.
**Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia,** [Moscow-Leningrad].
★**Weather,** Royal Meteorological Society, [London].
★**Weatherwise,** Amateur Weathermen of America, Philadelphia.
★**Wetter und Klima,** Deutscher Meteorologischer Dienst im Französischen Besatzungsgebiet, Seelbach b. Lahr/Baden, [French Zone, Germany].
★**Wetter und Leben,** Österreichische Gesellschaft für Meteorologie, [Vienna].
★**Zeitschrift für Meteorologie,** Meteorologisches Observatorium, Potsdam, [U. S. S. R. Zone, Germany].

★ Indicates those periodicals which are primarily meteorological.

# EXPLANATIONS

**Location of material:** While it is physically impossible to give for each entry the name of ever library where that item might be obtained, it is possible, by using standard library symbols, to gi the reader some idea of where he might obtain such material. So in most instances a symbol take from the Union List of Serials (Gregory), or the Union Catalogue of the Library of Congress will b given just before the text of each abstract. In some cases where no symbol has been assigned a library, one will be invented by using the general principle of the Union Catalogue list. As a ru the library indicated will be in the District of Columbia, with an occasional reference to one in Ne York or Boston. It will be noted that D stands for District of Columbia, M for Massachusetts ar N for New York. Thus **DWB** stands for the U. S. Weather Bureau Library in Washington, D. C and **MH–BH** for the Blue Hill branch of the Harvard Library in Boston, Mass. In the latter cas since the Blue Hill Observatory contains not only the Harvard Observatory Library but that of th American Meteorological Society, the same symbol (**MH–BH**) will stand for either or both librarie

**Library symbols:** The following abbreviations have been used for Libraries in which the speci material thus indicated in this issue is located:

| | |
|---|---|
| **DA:** | U. S. Department of Agriculture Library, Washington, D. C. |
| **DAMS:** | Material in hands of American Meteorological Society Abstracts, P.O. Box 173 Washington 13, D. C. |
| **DBS:** | U. S. Bureau of Standards Library, Washington, D. C. |
| **DLC:** | Library of Congress, Washington, D. C. |
| **DWB:** | U. S. Weather Bureau Library, Washington, D. C. |
| **MH:** | Harvard University Library, Cambribge, Mass. |
| **MH–BH:** | Harvard University, Blue Hill Observatory (and American Meteorological Societ Library, Milton, Mass. |

**Geographical (place) names** are in the form generally used internationally, rather than in the for used locally. For instance Vienna is used instead of Wien, Florence for Firenza, Moscow for Mosk and Germany for Deutschland, etc.

**Titles of articles or monographs** are in the language of the original article unless otherwise state Slavic (Cyrillic) titles are transliterated according to the Library of Congress transliteration schem into the Roman Alphabet.

Entries for **titles of periodicals** are given in the form used on the title page of the periodical providi the title is distinctive (Monthly Weather Review, Meteorologiské Zprávy, and Revista Meteo ológica). If the journal is the official organ of a society or institution and the title is not distinctiv as is the case with Transactions, Bulletins, Proceedings, Comptes Rendus, Trudy, Izvestiia, Sitzung berichte, Verhandelingen, Miscellanées, etc., the preferred name of the organization is given firs as part of the title (American Geophysical Union, Transactions; Royal Society of London, Pr ceedings).

**Abbreviations and other symbols:**

*Titles of periodicals* are not abbreviated as a rule. Other abbreviations will be used sparing and only when the abbreviation is obvious.

The months of the year from March through July are not abbreviated. Other months a abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec., respectively.

The word or abbreviation for Volume, (Tom, Band, Jahrgang, Año, etc.) and for Numb (Heft, Fascicule, Vypusk) and page or pages is omitted from most entries. Thus an entry will re as follows:

Meteorologische Rundschau 2(5/6):146–151, May/June 1949.

This indicates that the article was in the Meteorologische Rundschau, Jahrgang 2 (Vol. 2 Heft 5/6 (No. 5 and 6), pages 146–151, Mai/Juni 1949.

The symbol * before an entry indicates a good data source.

The symbol † before an entry indicates a good bibliography source.

The symbol § indicates a synoptic case history study accompanied by charts.

# PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

## GENERAL METEOROLOGY

6–1 551.5:63

*Post, J. J., **Statistisch onderzoek naar de samenhang tussen het weer, de grasproductie en de melkanvoer.** [Statistical research on the correlation between the weather, grass-production and milk-supply.] *Koninlijk Nederlands Meteorologisch Instituut, No. 102, Mededelingen en Verhandelingen, Ser. A*, 55, 's Gravenhage, **1949.** 119 p., 25 figs., 16 tables, (6 tables in fold) 31 refs., equations. Summary in Dutch, English and German p. 109–117. **DWB**—A model treatise in the field of agricultural meteorology, based on a sound statistical approach (after Fisher). The history of the Agricultural Meteorology Service in Holland (since 1943) and of the special type of research presented in this paper; previous works by a number of well-known authors (deVries, Lettau, Smit, Post and others); basic meteorological, grass supply and milk yield data used in this study; and statistical methods employed are treated at some length in separate chapters. The weather and agricultural conditions during each separate winter from 1909–1910 to 1938–1939, are taken up in narrative form. The results are presented for each of four districts of Holland in great detail in two chapters: one concerns the relations between temperature, cloudiness or rainy days with grass yield; and the second, the correlations between these elements and milk supply. Forecasts were made for a number of years not used in the series, by means of regression equations for each district. Significant correlations are tabulated and analyzed. The best results were obtained for the relation between May, June or July cloudiness or number of rainy days and milk supply; the month depending on the region. *Subject Headings:* **Agricultural meteorology, Dairying, Statistical studies, Holland.**—*M.R.*

6–2 551.5:8(42)

Bonacina, L. C. W., **William Wordsworth and the weather of Lakeland.** *Weather*, 5(5): 175–181, May **1950.** Photo (of Wordsworth's cottage). **DWB**—Quotations from Wordsworth's prose and poetry referring to weather, mainly in the Lake District of Cumberland. *Subject Headings:* **Meteorology, Literature, England.**

6–3 551.5(09)

Lafleur, Laurence, J., **Descartes, father of modern meteorology.** *American Meteorological Society, Bulletin*, 31(4):138–140, April **1950. DWB**—Comments on the content of each of the ten Discourses on Meteorology, wherein Descartes explains most meteorological phenomena on the basis of natural laws: general circulation and land-sea breezes due to differential heating, clouds, fog, hail, ice, snow, rain, frost, storms, thunder, lightning, the rainbow, halos, blue sky, mock suns, etc. He also states the kinetic theory of heat and gives a correct explanation for primary, secondary and extra rainbows. *Subject Headings:* **Meteorology, Descartes, History.**—*M.R.*

6–4 551.5 550.3 551.46:016

†*Bartels, Julius, and others, **Geophysics.** Wiesbaden, Office of Military Government for Germany. (British, French, United States) **1948.** Part I, 237 p. figs., tables, refs. Part II, 306 p. **(FIAT review of German science 1939–1946.) DLC**—This section of the comprehensive review of progress in science and of literature published by German scientists during the war years (1939–1946) is divided into two volumes, and each volume contains a number of articles by well qualified workers in the respective fields. References on general works at the beginning, and on specific fields at the end of each chapter, provide a major contribution to a classified bibliography of the science for this period. Articles of special interest in Part I are those by Bartels covering research on the aurora and the light of the night sky in Germany and Norway, and a section of periodicities and correlations of terrestrial with solar phenomena,

and a section on statistics in geophysics. Then there is an article by Dieminger on ionosphe research and one by Israel on atmospheric electricity. In Part II the chapter on seismolo contains a section on microseisms and their relation to storms, and a section on air-seisms G. A. Schulze and instrumentation by Baule. The chapter on oceanography by Böhnec and others, takes up expeditions, ice conditions at sea, ocean currents, water economy of t earth, and methods of observation. The chapter on hydrography by Friedrich deals wi ground water, evaporation, floods and flood forecasting, water temperatures, ice on inter waters, radiation problems, etc. Atmospheric ozone research is discussed by E. Regen including charts showing flow of ozone over the North Atlantic and Europe. In addition the bibliographies, there is an ample author and subject index (in German). *Subject Headin* **Geophysics, Meteorology, Hydrology, Oceanography, Hydrography, Microseisms, Bi liographies.**—*M.R.*

6–5 551.5:

P[aton], J[ames], **Scrap album of Alexander Buchan.** *Weather*, 5(3):119–122, Mar **1950.** photo. **DWB, MH-BH**—Extracts from letters from well-known scientists to Bucha *Subject Headings:* **Meteorology, Alexander Buchan, Biography.**

## METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

### OBSERVATIONS

6–6 551.501(C

Lauscher, F., **Hundert Jahre öffentliches meteorologisches Beobachtungsnetz in Österreic** [Hundred year observations of meteorological networks in Austria.] *Geographische Gese schaft, Wien, Mitteilungen*, 91(1–6):58, **1949. DLC**—The longest continuous record in Aust is the Vienna record (1734–1775), next longest Kremsmünster (1763) and Innsbruck (177 The Sonnblick Observatory was established in 1886 (3106 m). In 1848 Carl Kreil had a n work of 46 stations; up to now there have been observations taken in 617 places. At prese there are 190 climatic stations—during the war 150, and right after the war only 53. *Subj Headings:* **Networks, History, Austria.**—*M.R.*

6–7 551.501.3(C

*Sheppard, P. A., **The physical properties of air with reference to meteorological practi and the air-conditioning engineer.** *American Society of Mechanical Engineers, Transactio* 71(8):915–919, Nov. **1949.** table, 2 refs., equations. **DLC**—At the 16th session of t Aerological Commission of the I.M.O., a subcommission was formed, under the chairmansh of the author Mr. P. A. Sheppard, to recommend: (A) a set of consistent, internationa acceptable physical constants, and (B) definitions and specifications of water vapor in t atmosphere, for use in meteorology. Two reports were prepared by this subcommission, a the essence of these reports, which were thought to be of interest to air conditioning enginee is reprinted in this article. Subjects treated are: composition of dry air, International Ste Tables Calorie, gas constant, enthalpy and entropy of dry air, water vapor, and moist a saturation vapor pressure over water and over ice, mixing ratio, dew point, relative humidi wet bulb temperature, virtual temperature, etc. *Subject Headings:* **Physical constants, Wat vapor, Glossaries, Aerological Commission (I.M.O.)**—*M.R.*

6–8 551.501.4:551.5

Bilham, E. G., **New version of the humidity slide-rule.** *Meteorological Magazine*, [Lo don], 79(933):65–74, March **1950.** 3 figs., 3 refs., 6 equations. **DWB**—Decisions of Was ington 1947 Conference required modification of Bilham's humidity slide-rule introduced 1935. The scales are based on constants adopted in the Meteorological Office, London, a apply to upper air as well as surface data. Computations provided include: dew point, vap pressure, mixing ratio, specific humidity, vapor density, saturation vapor pressure with respe to water and ice, and saturation deficit. *Subject Headings:* **Methods of computation, Humidi** —*C.E.P.B.*

6–9 550.501.4

†*Claitor, L. C. and Crawford, D. B., **Thermodynamic properties of oxygen, nitrogen and air at low temperatures.** *American Society of Mechanical Engineers, Transactions,* 71(8):885–895. 11 figs., 13 tables, 36 refs., 21 equations. **DLC**—Charts and tables give temperature-entropy data over a wide range of pressure and temperature. Compiled from voluminous literature data. *Subject Headings:* **Physical constants, Thermodynamics.**

6–10 551.501.4:533.16

†*Hirschfelder, J. O., Bird, R. B., and Spotz, Ellen L., **Viscosity and other physical properties of gases and gas mixtures.** *American Society of Mechanical Engineers, Transactions,* 71(8):921–937, Nov. 1949. 6 figs., 21 tables, 30 refs., 76 equations. **DLC**—Charts and tables give a wealth of data and constants on viscosity of gases, some of which might be useful to a meteorologist. Summarizes and correlates a mass of data collected over 20 years. *Subject Headings:* **Physical constants, Thermodynamics, Viscosity of gases.**—*M.R.*

6–11 551.506.5:91.04:06(99)

Frankcom, C. E. N., **Joint expedition to the Antarctic.** *Marine Observer,* 20(148):103–104, April 1950. fig. **DWB**—*Subject Headings:* **Expeditions, Societies, Antarctic.**

6–12 551.506.5(99)

*Peterson, H. C., **Antarctic weather statistics compiled by Ronne Antarctic Expedition.** Washington, D. C., U. S., Dept. of the Navy, Sept. 1, 1948, 42 p., 3 figs., 31 tables append. **(Technical Report No. 1) Results of the solar radiation project of the Ronne Antarctic Expedition.** *Idem,* Oct. 1, 1948. 17 p., 7 figs., 6 tables, 6 equations. **(Technical Report No. 3) Weather observing program. A descriptive and suggestive summary compiled by Ronne Antarctic Research Expedition.** *Idem,* Nov. 1, 1948. 39 p., 10 figs., table, append. **(Technical Report No. 4.) DWB—Report No. 1,** Data obtained at Stonington Island, Antarctica, (directly opposite Cape Horn), Cape Keeler, the Plateau Station and Weddell Sledge Party, summarized and presented in graphs and tables. Data include: winds aloft, cloud, ceiling, fog, precipitation, snow cover, surface wind, flying days, pressure, temperature and relative humidity for one year (1947–1948). Data compared with that taken at Fairbanks, etc. **Report No. 3,** Brief report, well illustrated, of pyrheliometer observations made from Oct. 6, 1947 to Feb. 20, 1948 (with interruption due to breakage and power failure). Insolation compared with that at Fairbanks. **Report No. 4,** Narration of scope of weather prognosis, equipment, observational methods and trail observation program. Many pictures of equipment. Several pages devoted to code used on Trail Program to Weddell Sen (500 m. south of base) and Marguerite Bay (125 m. southwest of base). No upper air temperature or humidities obtained *Subject Headings:* **Observational data, Temperature observations, Expeditions, Antarctic.**—*M.R.*

## INSTRUMENTS

6–13 551.507.321.2

Schulze, Werner, **Platzhöhen von Radiosondenballonen und Ozongehalt der freien Atmosphäre.** [Bursting heights of radiosonde balloons and ozone content of upper atmosphere.] *Annalen der Meteorologie,* 3(1–2):42–48, [Jan.–Feb.] **1950.** 2 figs., 5 tables. Summary in German and English p. 42. **DWB**—Average bursting level of 350 gm. balloons rises from 112 mb. with tropopause at 320–270 mb. to 93 mb. with tropopause at 200–160 mb. For 500 gm. balloons bursting level rises from 80 to 67 mb. Variation of tropopause and bursting level are similar (highest in summer and in anticyclones). The relation is attributed to variations of ozone content of troposphere and sub-stratosphere, which is increased by turbulence and convection when tropopause descends. Effect of temperature is negligible in comparison. Bursting levels are somewhat lower by day than night (effect of insolation). *Subject Headings:* **Sounding balloons, Atmospheric structure.**—*C.E.P.B.*

6–14 551.508.43:551.508.822

Hinzpeter, Max, **Grundlagen der Temperaturkorrektion bei Aneroidbarometern in Radiosonden.** [Basis of temperature correction to aneroid barometers in radiosondes.]

*Annalen der Meteorologie*, 3(1–2):49–53, [Jan.–Feb.] **1950.** 3 figs., 9 formulas, plate, table. **DWB**—A complex formula is developed for change of temperature of aneroid in time $t$, in which the main term is $\gamma(k-t-ke^{-t/k})$ where $\gamma$ is temperature lapse and $k$ depends on ventilation and air density. A transparent scale is provided for finding $\gamma$ in °C./min.; $k$ was found by measurements in a wind tunnel and by replacing aneroid by a second bi-metallic thermometer and comparing readings during ascent and descent. Ventilation inside sonde is discussed. An expression found for rate of fall of sonde gives good results to 80 mb. By using this and a graph of $(k-t-ke^{-t/k})$ the temperature error of the aneroid can be found. *Subject Headings:* **Barometers, Radiosondes.**—*C.E.P.B.*

6–15 551.508.762:551.576.4:656.6

Schuyler, Garret, L., **Effect of ship motion upon measuring cloud height with a searchlight.** *American Geophysical Union, Transactions*, 29(4):464–466, Aug. **1948.** fig., 4 refs., 5 equations. *Subject Headings:* **Ceiling projectors, Marine meteorology.**

6–16 551.508.822:551.509.317

†§Béll, Béla, **Rádiószonda-felszállások Magyarországon.** [Radiosondes in Hungary.] *Időjárás*, 54(1–2):1–8, Jan.–Feb. **1950.** 3 figs., 8 refs. **DWB**—The Meteorological Institute in Hungary made use of the Lange radiosonde to make occasional soundings of the upper air until Dec. 1, 1949, when due to a subsidy from the Ministry of Transport and Communications it became possible to purchase enough Väisälä instruments to make regular flights. After the personnel became familiar with these instruments, the advantages of the new radiosondes (used in Finland since 1931) became apparent. Equipment is illustrated and data from a sounding during a peculiar weather situation (Jan. 6, 1950) presented in connection with a discussion of the synoptic conditions at that time. *Subject Headings:* **Radiosondes, Upper air analysis, Hungary.**—*M.R.*

6–17 551.508.91

Magill, Paul L., Rolston, Myra V., and Bremner, Raymond W., **Determination of free sulfur in the atmosphere.** *Analytical Chemistry*, 21(11):1411–1412, Nov. **1949.** 9 refs. **DLC**—A test is devised which will determine sulphur concentrations as low as .05 p.p.m. to within 90% accuracy. Useful in analyzing aerosol samples to determine low concentrations which might cause eye irritation. *Subject Headings:* **Air sampling and analysis, Sulphur content of air.**—*M.R.*

6–18 551.508.92:551.591.1

Great Britain. Meteorological Office, **Symposium on the measurement of visibility.** Opened by G. J. W. Oddie. *Meteorological Magazine*, [London], 79(934):112–118, April **1950.** 2 photos, 9 refs., 3 equations. **DWB**—Koschmieder's theory of daylight visibility is accepted, giving $V=3.91/\sigma$, $\sigma$=extinction coefficient of atmosphere. Visibility meters are described as: measuring air-light; measuring $\sigma$ directly by attenuation of artificial light; measuring scattering coefficient. Brewer-Beuttell meter is illustrated. Discussion centered largely on Gold meter. *Subject Heading:* **Visibility meters.**—*C.E.P.B.*

## SYNOPTIC ANALYSIS AND FORECASTING

6–19 551.509.1:656.6

Rantzen, M. J., **Airmet in the service of the seaman.** *Weather*, 5(2):44–48, Feb. **1950.** fig., 3 photos. **DWB**—Describes plotting weather charts for the amateur from broadcasts in clear. *Subject Headings:* **Transmission of reports, Marine meteorology.**

6–20 551.509.31(02):551.515

§Bleeker, Wouter, **Leerboek der meteorologie.** (Textbook of meteorology.) Zutphen, W. J. Thieme & Cie, 1942. **I. Synoptische meteorologie.** [Synoptic meteorology.] 364 p., 204 figs., tables. Append. A., bibliography. Append. B., glossary. **II. Meten en schatten van meteorologische grootheden.** [Measurements and estimation of meteorological quantities (magnitudes).] 98 p., 56 figs., 7 tables, 10 refs., equations. **III. Het opstellen en het ontcij-**

**feren van weerberichten.** [Plotting and decoding weather reports.] 119 p., 9 figs., symbols, numerous tables, 25 refs. **DLC**—This comprehensive work published in Holland during the war (1942) really consists of three books. Part I on synoptic meteorology (364 pages) includes the basic theoretical but mainly the practical aspects of weather analysis, fronts, air masses, aerological analysis and discussion of case histories. The second part comprises a handbook on instruments and methods of observation, conversion tables, etc., for observers at aerological, as well as at ordinary or airways stations. Part III (120 pages) is a coding and communications manual, now obsolete except for the discussion of networks and reporting systems. *Subject Headings:* **Synoptic meteorology, Observers manuals, Textbooks, Holland.**—*M.R.*

6–21 551.509.317:551.547

§Sutcliffe, R. C., and Forsdyke, A. G., **The theory and use of upper air thickness patterns in forecasting.** *Royal Meteorological Society, Quarterly Journal*, 76(328):189–217, April **1950.** 25 figs. **DWB**—An important pioneer paper, in which three-dimensional analysis of the troposphere is introduced by the combination of the surface synoptic chart with the 1,000–500 mb. thickness pattern. As an example, surface fronts and 1,000 mb. contours, 1,000–500 mb. thickness lines and 500 mb. contours are given for Northern Hemisphere Jan. 28–31, 1949. Thickness changes are due to advective, dynamical and non-adiabatic processes. Advective effect is given by regarding thickness lines as material lines in the surface geostrophic wind field; dynamic effect results from ascent (reducing thickness) or subsidence (increasing thickness); non-adiabatic processes, especially radiation, are equally important. As a practical climatological basis, monthly mean and extreme thickness charts over a 3-year period are given; they show mainly a geographical effect. The dynamical development is related to the geometry of the thickness patterns as indicating the vertical variation of vorticity transport. After a general discussion, selected sample patterns such as thermal troughs and ridges, thermal jets, etc. are discussed. In practice, the situations are more complex but can be recognized as self-maintaining or self-developing (warm sector depression, mobile high, jet stream complex), in which the circulation set up by advection maintains or increases the thermal distortion, and self-destroying (not yet studied). Barotropic situations are non-developmental. The bearing on practical forecasting is indicated and a step-by-step procedure, which has been used in experimental 4-day forecasts, is outlined. *Subject Headings:* **Thickness patterns, Upper air pressure, Methods of forecasting.**

6–22 551.509.34:551.524

Jefferson, G. J., **Temperature rise on clear mornings.** *Meteorological Magazine*, [London], 79(932):33–41, Feb. **1950,** 6 figs., 2 tables. **MH-BH**—Gold's method of forecasting maximum temperatures from tephigram is extended empirically to forecasting hourly temperatures from sunrise to 14 h. on fair dry days. Good results. *Subject Heading:* **Temperature forecasting.**

6–23 551.509.34:551.575.1

Jefferson, G. J., **Method for forecasting the time of clearance of radiation fog or low stratus.** *Meteorological Magazine*, [London], 79(934):102–109, April **1950.** 5 figs., table, 3 refs. **DWB**—Assuming that the temperature required for clearance can be estimated, time of clearance on a fine morning can be forecast by assuming that heat absorbed by surface layers is constant for time of year, adjusted by a "delay factor" based on thickness of fog or cloud. Percentage transmission of incident radiation is based on water content of fog. Seven examples are analyzed; method most useful in spring and autumn. *Subject Headings:* **Fog forecasting.**

6–24 551.5:632.187 551.509.39

†*§Foley, J. C., **A study of meteorological conditions associated with bush and grass fires and fire protection strategy in Australia.** *Australia Meteorological Branch, Bulletin No. 38,* 1947. 234 p., 16 figs., graphs, numerous tables, 104 refs., 5 append. **DWB**—An elaborate report on all phases of "fire-weather" work with special application to the forests and grasslands of Australia. General considerations of combustion, wind-factors, fire-weather stations and their equipment, fire hazard indices and methods of forecasting fire danger from antecedent precipitation and other conditions, both on a seasonal basis and a day-to-day basis. Discussion

of weather and warning services in each state and detailed records of meteorological condition associated with outstanding fires. Report contains many illustrative photographs an comprehensive charts, nomograms, graphs and useful conversion tables for analysis of weathe factors. One hundred and thirty-five pages devoted to actual case histories with man synoptic charts showing pressure situation at time of fire; and temperature, R. H., wind an rainfall given in tabular form. Bibliography of 104 references on forest-fire literature. Table and charts of annual and average precipitation. *Subject Headings:* **Fire weather forecasting Australia.**—*M.R.*

6–25 551.509.39:632.18

§Schroeder, Mark J., **The Hudson Bay High and the spring fire season in the Lake States** *American Meteorological Society, Bulletin*, 31(4):111–118, April **1950.** 8 charts, 3 refs. **DWI** —Examination of critical periods for fire danger in the Great Lakes region, indicates that warm and increasing anticyclone in the vicinity of Hudson Bay almost always results in a hig "burning index." Composite surface weather charts for two days before the first day of hig "burning index," and for two days after, show the relative movements and changes in air masses Five analyzed synoptic charts are presented illustrating high danger periods. *Subject Headings* **Fire weather forecasting, Lake States.**—*M.R.*

6–26 551.509.5

Brier, Glenn W., **Verification of forecasts expressed in terms of probability.** *Monthl Weather Review*, 78(1):1–3, Jan. **1950.** 2 tables, 4 refs., 4 equations. **MH-BH, DWB**—Brie suggests a new method of verifying forecasts which will force the forecaster to express a soun judgment of the reliability of his rainfall (or other) forecasts by squaring the deviations of th forecast from the observed probabilities. *Subject Heading:* **Forecast verification.**—*M.R.*

6–27 551.509.58:656.

Boyden, C. J., **Transatlantic flying from Prestwick Airport.** *Marine Observer*, 20(148):82 89, April **1950.** 6 fig. **DWB**—Popular account of forecast briefing for flights Prestwick t Gander and part played by merchant ships' reports. *Subject Headings:* **Forecast briefing Aeronautical meteorology.**

6–28 551.509.65

Korczyn, Julius and Clark, D. D., **Dissipation of fog.** *Weather*, 5(5):185–186, May **1950 DWB**—Two letters discussing possibility of dissipating fog by release of dry air or silica gel Clark finds cost prohibitive. *Subject Heading:* **Fog dissipation.**

## STRUCTURE AND PHYSICS OF THE ATMOSPHERE

### STRUCTURE OF THE ATMOSPHERE

6–29 551.510.4 551.593.7

†Neuberger, Hans, **Arago's neutral point: A neglected tool in meteorological research** *American Meteorological Society, Bulletin*, 31(4):119–125, April **1950.** 5 figs., 5 tables, 18 refs **DWB**—The Arago neutral point (A-point), primarily a function of scattering, is very sensitive to changes in atmospheric turbidity. This shows up markedly during times of major volcanic eruptions when large quantities of foreign matter are distributed through the atmosphere (See Part II, item F-17.) Analysis of such effects shown quantitatively in tables and graphs Especially the size of particles affects the blue and red light measurements of the A-point Usefulness of observations of this simple indicator for optical and radiation studies indicated Influence of terrain, snow cover, water surfaces and clouds discussed. *Subject Headings* **Turbidity, Atmospheric polarization, Arago's point.**—*M.R.*

6–30 551.510.5(03)

†Flohn, Hermann and Penndorf, R., **The stratification of the atmosphere (I).** *American Meteorological Society, Bulletin*, 31(3):71–78, March **1950.** 2 tables, 39 refs. Part II, *idem* 31(4):126–130, April **1950. DWB**—An important discussion of the nomenclature used in connection with the various layers of the atmosphere, based on a previous paper by the same

authors **Die Stockwerke der Atmosphäre,** (*Met. Zeit.*, 59:1–7, **1942**) but completely revised and brought up-to-date. In part I the troposphere, stratosphere, ionosphere and exosphere are carefully defined in terms of height, lapse rate, austausch and temperature. The troposphere is divided into the bottom layer, the ground layer, the advection layer and the tropopause layer. The three or four main types of tropopause are clearly defined and multiple tropopauses considered. Part II consists of qualitative and quantitative definition of the various layers of the stratosphere, with the proposed terms: (a) isothermal layer (8 or 16 km. to 30 km.), (b) the warm layer (30–50 km.), (c) the upper mixing layer (50–80 km.), (d) the ionosphere (80 km.–250 km.), and (e) the exosphere (650 or 800 km. to over 70,000 km.) References are cited to support most of the arguments and definitions. The term "ozonopause" is here proposed for the upper boundary of the warm layer, and "upper tropopause" for the upper boundary of the mixing layer. *Subject Headings:* **Atmospheric structure, Glossaries.**—*M.R.*

6–31 551.510.525

Jones, M. W., **Thickness of winter F-layer in polar regions.** *American Geophysical Union, Transactions*, 31, part 1, (2):187–190, April **1950.** 2 figs., table, 2 refs. **DWB**—*Subject Headings:* **Upper atmosphere, Ionospheric structure, Polar regions.**

6–32 551.510.53:551.521.4

Hulburt, E. C., **Night sky radiations from the upper atmosphere.** *American Journal of Physics*, 17(8):463–467, Nov. **1949.** 4 figs., 19 refs. **DLC**—A general discussion of present knowledge of night sky illumination (exclusive of auroral light). Subjects treated are: spectra of atomic and molecular origin; diurnal, annual and latitude variations; altitude of emissions and theory as to origin of night sky emissions. Aside from auroral effect, no latitudinal effect has been found. Altitude ranges from 60 km. to several hundred km. Of total visible light, ⅕ is due to stars and ⅘ to high atmosphere. *Subject Headings:* **Upper stratosphere, Light of the night sky.**—*M.R.*

6–33 551.510.534:551.557

§Penndorf, Rudolf, **Ozon und Wetter II.** [Ozone and weather II.] *Meteorologische Rundschau*, 3(3–4):49–54, March–April **1950.** 3 figs., table, 12 charts. Summary in German and English p. 49. **DWB**—Part I was in *Meteorologische Zeitschrift* 61, **1944.** Moser (1948) found close relations between ozone amount and trajectories at 225 mb. in Jan.–May (ozone gradient steepest) but not June–Dec. Author shows some surface and 97 mb. charts for Europe, Feb. 15–20 and Aug. 1–11, 1942 with ozone amounts at Tromsö, Aarhus and Arosa, and combined ozone charts relative to low and high pressure centers. These show two air masses, a southerly poor in ozone and a northerly rich in ozone. *Subject Headings:* **Ozone variations, Upper air winds, Europe.**—*C.E.P.B.*

## MECHANICS AND THERMODYNAMICS

6–34 551.511

Förchtgott, Jiří, **Aplikace Kármánovy cesty víru na poměry v atmosféře.** [Application of Kármánov's theory of vortex to the atmosphere.] *Meteorologické Zprávy*, 3(4–5):57–63, Feb. **1950.** 8 figs., 5 refs. **MH-BH**—Applying von Kármán's vortex theory under conditions such as are encountered in Czechoslovakia, the author considers waves above and waves behind an obstruction; and discusses and illustrates graphically the effect of obstacles on cloud formation, temperature, etc. Other topographic effects on wind and turbulence are analyzed in connection with the above theory. *Subject Headings:* **Vorticity, Turbulence, Orographic effects, Czechoslovakia.**—*M.R.*

6–35 551.511

§Petterssen, Sverre, **On the sensitivity of the wind field relative to pressure variations.** *Tellus*, 2(1):18–23, Feb. **1950.** 2 figs., table, 4 refs., 19 equations. **DWB**—The sensitivity depends on the lateral shear of the geostrophic wind and the tangential and orthogonal curvature of the geostrophic streamlines. When the geostrophic wind is large, the effect of the orthogonal curvature is predominant. Frictionless, adiabatic, three-dimensional motion is assumed. Highly condensed mathematical treatment, but illustrated by example of upper

air chart for April 3, 1948. Conclusion is: a second-order geostrophic approximation $|\ddot{V}| \ll d/dt \times (2\Omega \times V)H$ is introduced, although its use can only be justified empirically. *Subject Headings:* **Mechanics of the atmosphere, Geostrophic winds.**—*M.R.*

6–36 551.511:551.513.1

Queney, P., **Adiabatic perturbation equations for a zonal atmospheric current.** *Tellus*, 2(1):35–51, Feb. **1950.** 20 refs., 42 equations. **DWB**—The author gives the history of the perturbation problem from Newton down to the work of Eady (1949) and then attempts to derive the equations for long waves in a zonal air current so as to reduce the problem to a purely mathematical one capable of solution by mechanical computers. The equations are reduced to isentropic coordinates (orthogonal). The wave equation is greatly simplified by considering the order of magnitude of the parameters and the fluid displacement formulas (for vibration components). Waves are classified according to short, middle and long-period waves, depending on orbital frequency, etc.; and special cases such as elastic, gravitational and Rossby's waves are considered. Simplifications resulting from order of magnitude such as disregarding vertical motions or local pressure changes lead to incorrect derivations if made during the course of computations. *Subject Headings:* **Zonal circulation, Waves in the westerlies.**—*M.R.*

6–37 551.511:551.513

Van Mieghem, Jacques, **Sur la circulation transversale associée à un courant atmosphérique.** [On the transverse circulation associated with an atmospheric current.] *Tellus*, 2(1):52–55, Feb. **1950.** 5 refs., 3 equations. **DWB**—Discussion and criticism of theories regarding the zonal circulation associated with the *jet stream*, namely, that of *direct* circulation (caused by solenoids), versus *inverse* circulation (producing solenoids). Brief mathematical treatment of some of the problems follows. *Subject Headings:* **Mechanics of the atmosphere, Jet stream, Zonal circulation.**—*M.R.*

## GENERAL CIRCULATION

6–38 551.513

Chaudhury, A. M., **On the vertical distribution of wind and temperature over Indo-Pakistan along the meridian 76°E in winter.** *Tellus*, 2(1):56–62, Feb. **1950.** 10 figs., 17 refs. **DWB**—Data from aerological stations in India and Siberia are used to construct a mean meridional cross section (referred to long. 76°E.) showing effect of Himalaya Range on mean solenoidal and wind fields in the upper atmosphere. Over Asia three *jets* are found; two north and one south of the Himalayas, in contrast to the one or two *jets* found in cross sections made with North American data. Computed anomaly of Asiatic circulation shown graphically. Vertical circulation patterns, wind shear, absolute vorticity, the isentropic field, stability field, solenoidal field with respect to the *jet streams*, are discussed and illustrated by means of schematic diagrams. The *equatorial jet* is discussed in connection with the location of the winter rains in southern India. See Tun Yin (1949) item 3–87, *Meteorological Abstracts and Bibliography*, March **1950.** *Subject Headings:* **General circulation, Jet stream, India, Siberia.**—*M.R.*

6–39 551.513:551.524.7:551.571.7:551.557

†*Flohn, Hermann, **Grundzüge der allgemeinen atmosphärischen Zirkulation auf der Südhalbkugel.** [Fundamentals of the general atmospheric circulation over the Southern Hemisphere.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(1):17–64, **1950.** 12 figs., 22 tables, 65 refs. **DWB**—An important contribution to the climatology of the free atmosphere, integrating all of the aerological data available at the time for the Southern Hemisphere, with that obtained from the German Antarctic Expedition of 1938/1939 (as yet unpublished). Radiosondes used on this expedition (Marine-Sonde) are compared with the Lang-Sonde, with deviations for every level up to 10 gkm. shown for mid-latitudes and for the Antarctic. Corrections for radiation errors are applied to the data for 10 to 20 gkm., as well as for lower levels.

Among the useful tables and graphs which are presented, are: mean temperatures for various latitudes for various levels up to 20 gkm., as well as the actual data on which the

means are based; relative topography for various latitudes 500/1,000 mb., 225/500 mb., 96/225 mb. and 41/96 mb.; comparative data for arctic stations; meridional cross section of temperature; height and temperature of the tropopause determined from actual data and also from graphical smoothing. Similar data for relative and specific humidity, pressure (absolute topography of isobaric surfaces), and wind are presented and analyzed in terms of the zonal and meridional flow and the other elements of the general circulation. Finally there is a more detailed analysis of upper-air flow over the Antarctic. The bibliography lists 65 of the most important works on upper-air conditions in the Southern Hemisphere. *Subject Headings:* **General circulation, Upper air climatology, Southern Hemisphere, Antarctic.**—*M.R.*

6–40 550.513 550.557:551.558.2

Riehl, Herbert and Yeh, Tu-cheng, **The intensity of the net meridional circulation.** *Royal Meteorological Society, Quarterly Journal*, 76(328):182–188, April **1950.** 6 figs. **DWB**—Gives curves of mean values along parallels of latitude, 45°N. to 45°S. for surface in Jan. and July, of: (1) net meridional wind component, (2) sea-level pressure, (3) latitudinal divergence or convergence calculated from (1), (4) net vertical motion at 1 km. from (3), (5) net return flow 1–13 km. The meridional circulation is much too weak to maintain the vertical heat balance in low latitudes but is sufficient for the transfer of momentum. Results are applied to a diagram of atmospheric circulation. *Subject Headings:* **Atmospheric circulation, Meridional circulation, Energy transport.**

6–41 551.513:551.557

§Solot, Samuel B., **General circulation over the Anglo-Egyptian Sudan and adjacent regions.** *American Meteorological Society, Bulletin*, 31(3):85–94, March **1950.** 14 figs., 4 tables, 4 refs. **DWB, MH-BH**—A study of air-flow patterns over East Africa during four seasons: the dry season, the season of approaching rains, the rainy season and the season of retreating rains. Detailed one-day and five-day trajectories of the air flow in the layer from the surface to 10,000 ft., typical synoptic charts for the various seasons, seasonal upper-air temperatures, air-mass properties and location of upper-air observation stations are presented in graphs, charts and tables. The ITC (Intertropical Convergence Zone) is shown to be the major climatic control. [Paper based on a previous report by the author, published by the U. S. Air Weather Service (Technical Report No. 105–50).] *Subject Headings:* **Tropical meteorology, General circulation, Upper air winds, Air masses, Sudan, East Africa.**—*M.R.*

6–42 551.513,1

†§Riehl, Herbert, **On the role of the tropics in the general circulation of the atmosphere.** *Tellus*, 2(1):1–17, Feb. **1950.** 16 figs., 23 refs. **DWB**—An important, analytical contribution to knowledge of the upper tropospheric circulation in low latitudes. The classical theory of steadiness of circulation in the Tropics is shown to be true only for the lower levels (up to base of cumulus). Above the cloud level the circulation is extremely variable up to the tropopause, and it is in these levels that heat is pumped into the general circulation by release of latent heat as moisture is condensed on a widespread scale in isolated regions of the Tropics. Constant pressure charts for 300 mb., with analyses extending into the tropics for the first time (during the latter part of the war) show that troughs at that level actually extend into the Tropics and thus are capable of carrying this released latent heat into mid-latitudes. *Subject Headings:* **General circulation, Tropical meteorology.**—*M.R.*

## ATMOSPHERIC DISTURBANCES

6–43 551.515:523.74

§Pícha, Jaroslav, **Vliv sluneční aktivity na atmosférickou cirkulaci.** [The influence of solar activity on the atmospheric circulation.] *Meteorologické Zprávy*, 3(4–5):64–70, Feb. **1950.** 18 charts, 3 diagrs., 25 refs. **MH-BH**—Previous research by Dellinger, Clayton, Abbot, Schell and others is reviewed. U. S. Weather Bureau data and Northern Hemisphere Charts are used to construct curves showing the relation between relative sunspot numbers and the annual number of (a) cyclones (<1,000 mb.) and (b) anticyclones (>1,020 mb.) for the period 1899–1947. An 11-year period shows plainly on both charts, with the discrepancies easily explained by the presence of an 8-year cycle. Synoptic charts for 18 typical situations

at different phases of solar activity, are presented. The author concludes that cyclones deepen at times of increasing solar activity, but with rapidly increasing activity the circulation weakens. Also, anticyclones form at higher latitudes and cyclones form in the subtropics at times of maximum solar activity. *Subject Headings:* **Sunspots, Atmospheric circulation, Periodicities.**—*M.R.*

6–44 551.515.11:551.547

Great Britain. Meteorological Office, **The formation and behaviour of secondary depressions on warm fronts, cold fronts and occlusions.** *Meteorological Magazine*, [London], 79(935):146–149, May **1950. DWB**—J. S. Sawyer described investigations of thickness pattern, 1,000–500 mb., on occasions of formation of secondary depressions. Rules for forecasting new cyclogenetic waves on cold fronts 1,200 or more miles long with a thermal wind of 25 kts. are given. The discussion ranged over much of the field of synoptic meteorology. Sir Nelson Johnson, summing up, said that despite limitations the technique of thickness patterns is extremely important. *Subject Headings:* **Cyclogenesis, Secondary depressions.**

6–45 551.515.127:551.509.317

El-Fandy, M. G., **Troughs in the upper westerlies and cyclonic developments in the Nile valley.** *Royal Meteorological Society, Quarterly Journal*, 76(328):166–172, April **1950.** 4 figs., 2 tables. **DWB**—In the Egyptian-Abyssinian region troughs develop in the upper westerlies above 2 km. extending as far as 20°N. Centers of convergence form at their southern limits; these were studied by stream-line charts, two sequences of which are given. They develop into upper cyclones of two types, one travelling NE or N and the other SW in the usual E–NE upper current; the latter may ultimately give rise to the "tornadoes" of West Africa. Analysis is of value in forecasting upper winds. *Subject Headings:* **Atmospheric disturbances, Forecasting winds aloft, Egypt, Abyssinia.**

6–46 551.515.4 629.13:(02)

†*§Byers, Horace R. and Braham, Roscoe R., Jr., **The thunderstorm; report of the thunderstorm project.** (A joint project of four U. S. Government Agencies: Air Force, Navy, National Advisory Committee for Aeronautics, and Weather Bureau.) Washington, D. C., U. S. Govt. Printing Office, June **1949.** 287 p., 254 figs., 49 tables, 63 refs., append. **MH-BH, DLC**—The final and most comprehensive of the score of reports issued by Dr. Byers and his collaborators on various phases of the thunderstorm project. In the preface mention is made of over 80 professional meteorologists and technicians, who have in one way or another been associated with this project and report. A history of the project, since it was first conceived (in 1943) and begun (in August 1945), is followed by a discussion of the design of the observational program and the areas of observation (Orlando, Florida in 1946, and Wilmington, Ohio in 1947). Details of the topography, climatology and micrometeorological networks in the above regions are given in photographs, tables and charts.

The body of the report is divided into three parts: I (Chapters I to VIII), a description of the structure, wind fields, electrical fields, turbulence and precipitation of thunderstorms. II (Chapters IX and X), effect of thunderstorms on flight of aircraft and on ground operations. III, detailed case histories of five thunderstorm situations plus several squall-line situations. An appendix describes and illustrates surface, upper air, radar and airplane instruments and photographic equipment. A useful bibliography and index are also included. It is impossible to go into detail regarding the wealth of original data, charts and diagrams showing gust velocities, rainfall intensities, rate of growth of cumuli, temperature differences inside clouds, pressure, humidity, wind and temperature changes, electrical fields, cloud coverage, etc. Of course the large number of PPI-Scope (radar) photographs gives the work added detail and value heretofore impossible in works of this kind. The chapters on preferred areas of thunderstorm development, and on the effect of environment wind field on existing thunderstorms are especially interesting. The whole report is logically arranged and well balanced, yet leaves the impression that only a small portion of the value has been extracted from the vast amount of observational material accumulated by this project. *Subject Headings:* **Thunderstorms, Aeronautical meteorology, Textbooks.**—*M.R.*

6–47 551.515.4:551.501.8

*Hilst, G. R., and MacDowell, G. P., **Radar measurements of the initial growth of thunderstorm precipitation cells.** *American Meteorological Society, Bulletin*, 31(3):95–99, March **1950.** 4 figs., table, 4 refs. **DWB, MH-BH**—A thunderstorm near Cambridge, Mass. which spread steadily but rapidly in a horizontal plane and which developed vertically at a rate of 1,000 ft./min. during the first 10 minutes, was studied by means of PPI and RHI scope photographs and by in-flight measurements of vertical gusts, drafts and liquid water content. Extreme turbulence was encountered (adjacent effective gusts of −17 and +22 ft./sec.). Data presented effectively in charts and graphs. *Subject Headings:* **Thunderstorm structure, Vertical velocities, Radar photographs, Cambridge, Massachusetts.**—*M.R.*

6–48 551.524:551.515.8:551.588.1

Prager, Erwin, **Zur Frage der Erwärmung kalter Festlandsluft nach ihrem Übertritt auf See.** [On the question of warming of cold continental air after its passage over the sea.] *Annalen der Meteorologie*, 3(1–2):10–19, Jan.–Feb. **1950.** 6 figs. Summary in English p. 10. **DWB**—Observations are analyzed during two cold periods: 14–25 Dec. 1946 and 1–12 Jan. 1947 at coastal stations and lightships off N.W. Germany. Sea temperature was +5 to 10°C., decreasing slowly. Air temperature was −5 to −15°C. at Hamburg and Jever but averaged 10°C. higher (on extreme days over 15° higher) at lightships. Rate of warming about 0.3°C. per 10 km. Structure of air shown by temperature and equivalent potential temperature from radiosondes at Hamburg and Jever. The cold air was thin, not reaching 900 mb., with an inversion above; this is the normal condition. *Subject Headings:* **Air masses, Energy exchange, Marine influences.**—*C.E.P.B.*

## RADIATION AND TEMPERATURE

### RADIATION

6–49 551.521:551.586

Wachter, Heinz, **Strahlungsmessung für bioklimatische Zwecke.** [Measurement of radiation for bioclimatic purposes.] *Meteorologische Rundschau*, 3(3–4):65–68, March–April **1950.** table, 14 refs. **DWB**—The heat properties of the body are compared with those of various frigorimeters. Heat capacity/surface area is the essential characteristic and only the frigorimeter of Dorno and Thilenius is comparable with human body in this. Total radiation reaching a point is closely related to cooling power. This is measured by "integral temperature" which would give such radiation. On one day integral temperatures of 34°C. at midday and −14°C. at night were found. *Subject Headings:* **Radiation measurements, Medical meteorology.**—*C.E.P.B.*

6–50 551.521.3:551.510

*Fesenkov, V. G., **Nekotorye soobrazheniia ob opticheskikh cvoistvakh atmosfery.** [Some remarks on the optical characteristics of the atmosphere.] *Astronomicheskii Zhurnal*, 22(4):215–230, **1945.** 5 tables, 2 equations. Summary in French p. 229–230. **DLC**—Most astronomers erroneously assume that the physical properties of the atmosphere vary only with height. Based on observations made by the author, Mme. E. V. Fesenkova, and others in the region near Alma-Ata, quantitative values of sky brightness at various angular distances from the sun, but especially in the immediate vicinity of the sun, lead to results contrary to expectation. The effect of albedo or type of reflecting surface (sand, glacier, snow, grass, etc.) proved to be negligible compared to the effect of atmospheric aerosols, especially dust. Charts of the deviation of daytime sky brightness from the theoretical were compiled and various factors indicated thereon in attempt to explain anomalies. Water vapor acts as an aerosol, not as a gas, hence does not follow the Rayleigh formula in respect to absorption. Equipment, devised by the author, for determining sky brightness and size and quantity of aerosol particles (ultramicroscopic), described and data obtained from various sources presented in tables. Work of Houghton, Stratton, Vassy, Götz, Engelhard and Friess, and others cited. *Subject Headings:* **Sky brightness, Scattering, Albedo, Aerosols, Alma-Ata, U.S.S.R.**—*M.R.*

6–51 551.521.3

Kuznetsov, E. S., and Ovchinskii, B. V., **Rezul'taty chislennogo resheniia integral'nogo uravneniia teorii rasseianiia sveta v atmosfere.** [Results of quantitative solution of integral equations on the theory of dispersion of light in atmosphere.] *Geofizicheskii Institut, Trudy,* No. 4(131), Moscow, Izdat. Akademii Nauk, SSSR, **1949.** numerous figs., 89 tables, 179 equations, 4 refs. **DLC**—As a result of work done during 1943–1944 in the Mathematical Department of the Geophysical Institute (Akademii Nauk, SSSR), 89 tables of coefficients and functions covering 12 phases of the subject are presented along with six articles by the authors, explaining the theory and operations that went into the computation of these tables. Article I, consists of the theory on which tables of functions $E_n(\chi)$ were based. Article II, is on the solution of the integral equations on the theory of dispersion of light by the method of successive approximation (including albedo). Article IV, on smoothing techniques and article VI, on the application of the above solution to the compilation of tables of the coefficient of extinction, are by Kuznetsov. Ovchinskii has contributed articles III, and V, on improving the zero approximation, and on the accuracy of the approximation method of Chandrasekar, respectively. Four graphs show the comparative accuracy of the "exact solution" with that of Chandrasekar. *Subject Headings:* **Light dispersion, Extinction coefficients.**—*M.R.*

6–52 551.521.31:697

**Sunlight heats this house.** *Science Illustrated,* 4(3):28–31, March **1949.** 6 figs. **DWB**—Explanation of operation of Solar House in Dover, Mass. Heat stored in bins containing Glauber's salt keep house at 70°F. throughout winter. *Subject Headings:* **Solar radiation, Applied meteorology.**

6–53 551.521.63

Penndorf, Rudolf, **Das ultraviolette Sonnenspektrum auf Grund neuerer Messungen (Raketenaufstiege).** [The ultraviolet solar spectrum on the basis of recent measurements (rocket ascents).] *Annalen der Meteorologie,* 3(1–2):35–37, [Jan.–Feb.] **1950.** 2 figs. Summary in English p. 35. **DWB**—Analyzes measurements at 55 and 72 km. with grating spectrograph, 2200–3400A, in two rocket flights at White Sands. The intensity is much less than that of a black body at 6000°K., especially below 2650A. Fig. 2 gives a detailed spectrum 2600–2950A in per cent of black body, and shows Fraunhofer lines at 2796 and 2803 (Magnesium ions), 2850 (Mg. atoms) and 2880 (Silica atoms). These new data are valuable for ozone studies. *Subject Headings:* **Ultraviolet light, Solar spectrum.**—*C.E.P.B.*

## TEMPERATURE

6–54 551.524:551.55:551.311.182

Neumann, Kurt, **Die Wachstumsgeschwindigkeit von Eisdecken in Abhängigkeit von Lufttemperatur und Windgeschwindigkeit.** [The rate of growth of ice covers in relation to air temperature and wind speed.] *Annalen der Meteorologie,* 2(5–6):144–155, May–June **1949.** 5 figs., 2 tables, 9 refs., 34 equations. Summary in German and English. **MH-BH**—Author derives complex theoretical expressions for the rate of growth and surface temperature of an ice-sheet over water in terms of air temperature, wind speed and heat conduction ice-air. Results are checked by experiments in a freezing chamber; they agree reasonably well with those of H. T. Barnes (*Ice Engineering,* **1928**). *Subject Headings:* **Atmospheric temperature, Winds, Ice.**—*C.E.P.B.*

6–55 551.524 551.508.29

Fleagle, Robert G., **The optical measurement of lapse rate.** *American Meteorological Society, Bulletin,* 31(2):51–55, Feb. **1950.** 4 figs., 11 refs., 14 equations. **DWB, MH-BH**—When lapse rates in vapor pressure are not appreciable, the vertical temperature gradient in the boundary layer (the lowest 2 to 10 m. above the ground) can be determined by the apparent elevation of an object as viewed through a telescope. Charts are given for calculating lapse rate from difference between true and apparent elevations with various lengths of optical path. *Subject Headings:* **Lapse rate determination, Optical methods, Micrometeorology.**—*M.R.*

6–56 551.524.3

Liljequist, G. H., **On fluctuations of the summer mean temperature in Sweden.** *Glaciers and Climate. Geografiska Annaler,* 31(1–4):159–178, **1949.** 6 figs., 4 tables, 16 refs., 12 equations. **MH-BH**—Mean Stockholm temperatures, June–Aug. 1756–1947, are shown as 5-, 10-, 20-, 40- and 80-year overlapping means, other stations and Iceland ice since 1860 by 10-year means. They show a general rise in recent years and oscillations. Periodogram analysis of Stockholm series gives as probably real: 1756–1871, 17, 41, possibly 24 years; 1852–1947, 21, 29, 48 years; 1756–1947, 20, 30, 40–42 years; but periodicities account for less than 10–20% of the variation. Finally, Stockholm summers are graduated; distribution agrees well enough with normal curve calculated from standard deviation. *Subject Headings:* **Temperature variations, Periodicities, Sweden.**—*C.E.P.B.*

6–57 551.524.31:551.524.7

*Abild, Bruno, **Zum täglichen Temperaturgang in der freien Atmosphäre.** [On the diurnal variation of temperature in the free atmosphere.] *Annalen der Meteorologie,* 3(1–2):38–41, [Jan.–Feb.] **1950.** fig., 5 tables. **DWB**—Airplane and radiosonde data are used to find difference between morning and afternoon mean temperatures at levels up to 100 mb. or 15 km. over Germany. Differences vary from 4°C. at surface to about 0.5°C. between 800 and 400 mb., increasing again to 1°C. in lower stratosphere. Diurnal variation between 1000 and 600 mb. less in anticyclonic than humid conditions. *Subject Headings:* **Temperature variations, Diurnal variations, Upper air temperatures.**—*C.E.P.B.*

6–58 551.524.34 551.577.34(491)

Eythorsson, J., **Temperature variations in Iceland.** *Glaciers and Climate. Geografiska Annaler,* 31(1–4):36–55, **1949.** 8 figs., 9 tables, 4 refs. **MH-BH**—After discussing material, author gives monthly averages of temperature at Stykkishólmur for various periods between 1846 and 1945, other stations and sea temperature 1872–1922 and 1901–1930. Steady rise of annual means at all stations and monthly means in winter, amounting to over 1°C., is shown in numerous graphs. Precipitation also shows a general rise by over 200 mm. since 1880. Variations of glacier fronts compared. *Subject Headings:* **Temperature variations, Precipitation variations, Iceland.**—*C.E.P.B.*

6–59 551.524.34(73)

Landsberg, H., **Climatic trends in the series of temperature observations at New Haven, Connecticut.** *Glaciers and Climate. Geografiska Annaler,* 31(1–4):125–132, **1949.** 2 figs., 5 tables, 22 refs. **MH-BH**—Record complete since 1780 except 1795. To minimize effect of growing city area, author uses 30-year overlapping curves of $R$ (difference between warmest and coldest months) and thermoisodromic index $T_i = 100(T_{oct} - T_{apr})/R$. Since 1850 $R$ has decreased and $T_i$ increased, showing decreased continentality. Statistical tests based on mean and standard deviation of $R$ and difference Oct.–April show that the climatic change is statistically real. There is a double variation of $R$ within sunspot cycle, maximum $R$ at spot minimum and two years after spot maximum. *Subject Headings:* **Temperature variations, New Haven.**—*C.E.P.B.*

6–60 551.524.4:551.554

Roll, Hans-Ulrich, **Gedanken über den Zusammenhang der vertikalen Profile von Windgeschwindigkeit und Temperatur in der wassernahen Luftschicht.** [Ideas on the relation of the vertical profile of wind speed and temperature in the air layer near water.] *Annalen der Meteorologie,* 3(1–2):1–9, [Jan.–Feb.] **1950.** 5 figs. Summary in English p. 1. **DWB**—Observations at island of Neuwerk in North Sea at heights of 1–505 cm., show logarithmic increases of wind speed with height. Some simultaneous temperature profiles show a logarithmic decrease. These support theory that in a height zone of a few meters ("sub-layer") shearing stress plays the decisive part in the vertical exchange mechanism and consequently wind and temperature distributions can be described by analogous logarithmic functions of height. Prandtl's law of a linear height function of mixing length applies independently of temperature stratification. The relation of this "sub-layer" to Rossby's 100 m. "turbulent

boundary" is not clear. Above the sub-layer in unstable conditions thermal exchange due to vertical movement produces an adiabatic intermediate layer. *Subject Headings:* **Lapse rates, Turbulent exchange, North Sea.**—*C.E.P.B.*

6–61 551.524.4 551.571.4

Gordon, A. H., **Temperature and humidity lapse rates near the ocean surface.** *Meteorological Magazine*, [London], 79(935):141–143, May **1950.** 2 figs. **DWB**—Psychrometer readings were obtained at weather ship station JIG (North Atlantic) from sea-surface to 60–80 feet. Three examples of curves of temperature and relative humidity are shown. *Subject Headings:* **Lapse rates, Temperature distribution, Humidity distribution.**

## ATMOSPHERIC PRESSURE AND WIND

### PRESSURE

6–62 551.543

Essenwanger, O., **Wahre Expektanz und Erhaltungsneigung des Luftdrucks.** [True expectancy and persistence tendency of pressure.] *Meteorologische Rundschau*, 3(3–4):62–65, March–April **1950.** 6 figs., 5 tables. **DWB**—Autocorrelation coefficients $K_s$ ($s$ = lag in days) of daily pressures at Bamberg for 25 winters and summers calculated by a short method. Mean coefficients:

| Lag, days | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Winter + | .75 | .51 | .34 | .21 | .15 | .10 | .09 | .07 | .07 | .10 | .09 | .10 | .07 | .04 |
| Summer + | .71 | .44 | .30 | .21 | .18 | .12 | .10 | .08 | | | | | | |

They differ little from expectancy calculated from $K_s = (1+\lambda s)e^{-\lambda s}$ where $\lambda = 2/3$, but are somewhat higher for lags exceeding seven days. *Subject Headings:* **Pressure variations, Correlation coefficients, Germany.**—*C.E.P.B.*

6–63 551.543.3 551.507.321

§Emmons, G., Haurwitz, B., and Spilhaus, A. F., **Oscillations in the stratosphere and high troposphere.** *American Meteorological Society, Bulletin*, 31(4):135–138, April **1950.** 2 figs., table, 3 refs., 2 equations. **DWB**—Two constant level balloon flights at heights of 30 to 40 thousand feet showed evidence of pressure oscillations of from four to ten minutes. Theoretical calculations based on lapse rate data obtained from previous radiosonde flights shows periods roughly in agreement with those on the barograms carried on the constant level balloons. An analyzed 200 mb. chart for the eastern U. S. shows position of balloon with respect to fronts, weather clouds, and contours on May 4, 1948. *Subject Headings:* **Pressure oscillations, Constant level balloons, Upper air observations.**—*M.R.*

6–64 551.543.3

Flohn, Hermann, **Zur physikalischen Deutung der Witterungsregelfälle (1 Mitteilung).** [On the physical meaning of examples of weather rules (1st communication).] *Annalen der Meteorologie*, 3(1–2):57–59, [Jan.–Feb.] **1950.** fig. **DWB**—Singularities are attributed to pressure waves which are either persistent harmonics of year (especially 30.5 days) or originate at about the same time in successive years. The latter may be due to thermal effects of earth-shadow on very high atmospheric levels, in polar latitudes in winter. 18 refs. quoted without titles. *Subject Headings:* **Singularities, Pressure variations.**—*C.E.P.B.*

6–65 551.543.5

Newnham, E. V., **Recent long period with pressure above normal over Europe and the North Atlantic.** *Meteorological Magazine*, [London], 79(935):129–133, May **1950.** 5 figs. **DWB**—From Oct. 1948 to Sept. 1949 pressure averaged above normal from eastern North America to Aral Sea, the excess being 2.5 mb. over Europe. Type of distribution was very persistent Jan. to April 1949. Similar but less persistent distribution prevailed Feb.–Dec. 1921. *Subject Headings:* **Pressure distribution, Europe, North Atlantic.**

## WIND

6–66 551.551

Batchelor, G. K., **The application of the similarity theory of turbulence to atmospheric diffusion.** *Royal Meteorological Society, Quarterly Journal*, 76(328):133–146, April **1950.** 19 formulas, table. **DWB**—The paper draws attention to Kolmogoroff's similarity theory of small-scale structure of turbulent motion and its application to atmospheric and oceanic turbulence. Average properties of small eddies are determined by $\nu$ (kinematic viscosity) and $\epsilon$ (rate of dissipation per unit mass of fluid, energy being supplied by larger eddies), and in the inertial subrange only by $\epsilon$. The Reynolds numbers at which these principles hold are discussed. In the free air $(\nu^3/\epsilon)^{\frac{1}{4}}$ nearly $= 0.2$ cm. and the inertial subrange is large (ca. 1 to 100+meters). It is found that theory cannot be applied to diffusion from a fixed source, but is applicable to a moving source, and predictions of increase of mean square distance between particles are made. The results are compared with observations of diffusion of pairs of particles by Durst and Richardson and Stommel and some agreement is found. Richardson's empirical proportionality between the diffusion coefficient K and the 4/3 power of scale of observation is in general agreement with the theory. *Subject Headings:* **Turbulence theory, Eddy diffusion.**

6–67 551.551:551.54

Rodewald, M., **Die Wirbelstrasse bei Jan Mayen.** [The eddy track at Jan Mayen.] *Annalen der Meteorologie*, 3(1–2):25–26, [Jan.–Feb.] **1950. DWB**—Review of book by H. Wehner: **Untersuchung mikrobarischer Wellen auf Jan Mayen.** [Investigation of microbaric waves at Jan Mayen.] *Berlin, Veröff. Geophys. Univ. Leipzig, Ser.* 2, Vol. 16, No. 1, 1949. Describes whirls with vertical axes forming in lee of mountains with north winds and drifting south. *Subject Headings:* **Orographic effects, Jan Mayen Island, Arctic Ocean.**—*C.E.P.B.*

6–68 551.506:551.555(498)

*Cișman, Alex, and Boțan, N. V., **Considerațiuni asupra posibilităților de folosire a energiei vîntului in România.** [Considerations on the possibility of utilizing wind energy in Romania.] *Revista Științifică*, 34(1–2):35–42, Jan.–June **1948.** fig., 4 tables, ref. **DLC**—In order to evaluate the efficiency of proposed wind generators (similar to that installed in Crimea by the Soviet Union), wind data for a score of stations in Romania are presented and discussed. A chart shows the windy portion of Romania. Percentage of calms, minimum annual values, mean values and estimated percentage of time the generators would operate are given in tables by seasons for each station. *Subject Headings:* **Wind data, Wind generators, Romania.**—*M.R.*

6–69 551.555.4:551.558.21(495)

Prügel, Heinrich, **Leewirkungen an den Gebirgen nördlich der Bucht von Saloniki.** [Lee effects on the mountains of the Gulf of Salonika.] *Meteorologische Rundschau*, 2(7–8):219–222, July–Aug. **1949.** 3 figs., 2 tables, 3 refs. **MH-BH**—At the mountain range NW of Salonika characteristic wave formations develop in strong NW winds. Two examples in stable air are investigated with upper-air data; these were not turbulent in upper air. Waves in labile air also occur and give squally winds and CuNb. Two types of Vardar winds are described; the normal type with labile cold air and the "Winter Vardar" with a surface flow of cold air from the reservoir in Balkan Mountain basins. *Subject Headings:* **Orographic effects, Vardar winds, Salonika, Greece.**—*C.E.P.B.*

6–70 551.557.31(664)

Hogg, W. H., **Diurnal variation of upper wind at Freetown.** *Meteorological Magazine*, [London], 79(935):133–137, May **1950.** 2 figs., 3 tables. **DWB**—From pilot balloon observations at Freetown, Sierra Leone, mean vector changes of wind 6h.–11h., 11h.–16h., 16h.–6h., are shown for surface, 1,000, 2,000, 3,000 and 4,000 feet for four seasons. Sea breeze effect is determined by general run of coast, and components normal to this are calculated. During most of year wind is off sea up to 3,000 feet and off land at 4,000 feet; a vector off land is added between 16h. and 11h., off sea between 11h. and 16h. *Subject Headings:* **Upper air winds, Wind variations, Freetown, Sierra Leone.**

# AQUEOUS VAPOR AND HYDROMETEOROLOGY

## RAINFALL

6–71 551.577.3:551.501.4

†*Loewe, F., **Some considerations regarding the variability of annual rainfall in Australia.** *Australia Meteorological Branch, Bulletin No. 39*, p. 1–3, **1948.** 8 figs., 5 tables, 27 refs., equation, append. **DWB**—Charts show average and extreme rainfall variability indices for Australia for 1913–1937, 1888–1937, and for 25 years around 1900 and 1925. Data given for each station. Methods of analysis explained.

†Radok, U., **On the nature of variations in Queensland rainfall.** *Idem*, p. 15–35. 18 figs., 11 tables, 43 refs., append. Detailed statistical study of monthly and annual rainfall data for Queensland. Charts and graph show processes used. Punch cards employed and methods described. *Subject Headings:* **Rainfall variations, Statistical studies, Correlations, Queensland, Australia.**—**M.***R.*

6–72 551.577.33:551.590.22

Brandtner, Erwin, **Über die Realität der synodischen Mondperiode im Niederschlagsgang.** [On the reality of the synodic lunar period in the variation of rainfall.] *Meteorologische Rundschau*, 2(5–6):151–153, May–June **1949.** fig., 9 refs. **DWB**—The apparent periodicity (29d. 12h. 44m.) in 65 years rainfall at Würzburg is too small and irregular to satisfy the criteria of reality. *Subject Headings:* **Precipitation variations, Lunar influences.**—*C.E.P.B.*

6–73 551.577.36:551.509.3

Jorgensen, Donald L., **Persistency of rain and no-rain periods during the winter at San Francisco.** *Monthly Weather Review*, 77(11):303–307, Nov. **1949.** 4 figs., 3 tables, 6 refs., 2 equations. **DWB**—Based on 20 years of rainfall records, elaborate graphs showing duration-frequency of rain or drought are presented as a forecast aid or a check on forecast skill. Persistence attributed to table flow patterns in the North Pacific. *Subject Headings:* **Rainfall frequencies, Methods of forecasting, San Francisco.**—*M.R.*

6–74 551.577.37

§Dightman, Richard A., **Montana Marias Basin rainstorm, June 16–17, 1948.** *Monthly Weather Review*, 78(1):6–12, Jan. **1950.** 5 figs., 3 tables, 4 refs. **DWB**—Chart of north central Montana shows isohyets of total rainfall for storm which exceeded nine inches at two different centers. Hourly amounts from five weighing rain-gage stations are used along with numerous cooperative records to calculate depth-area and duration data. Synoptic conditions described and illustrated by means of surface, 850 mb., 700 mb. charts and lapse-rate charts for three soundings at Great Falls. Storm compared with other record storms in area. On June 16, a strong flow of moist air from the Gulf of Mexico at 850 mb. was moving up the east slope of the Divide as far as Edmonton, with a strong surface anticyclone over Saskatchewan. *Subject Headings:* **Excessive rainfall, Rainfall intensity, Flood forecasting, Montana.**—*M.R.*

6–75 551.577.37

†*Jennings, Arthur H., **World's greatest observed point rainfalls.** *Monthly Weather Review*, 78(1):4–5, Jan. **1950.** fig., 2 tables, 19 refs. **DWB**—A tabulation of the 60 odd record rainfalls for periods ranging from one minute to two years is accompanied by a chart on which these values are plotted on log—log scale, forming an unusually well defined linear envelope. References are given for all sources of data. *Subject Headings:* **Excessive rainfall, Rainfall intensity, Climatic extremes.**—*M.R.*

## HYDROMETEOROLOGY

6–76 551.579:519.2

Bydin, F. I., **Transformirovanie atmosfernykh osadkov v urovni Kaspiĭskogo moria.** [Transformation of atmospheric precipitation at the height of the Caspian Sea level.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Izvestiia*, 78(3):352–355, **1946.** 2 figs., table. **MH-BH, DWB**—Records of precipitation and level of the Caspian Sea for the period 1898–1938 are

correlated. Complete synchronization is not evident, but best correlations are produced for a lag of 13 years with the peak at two years. Actual data and coefficients are given in tabular and graphic form. *Subject Headings:* **Hydrometeorology, Correlation coefficients, Caspian Sea, U.S.S.R.**—*M.R.*

6–77 551.509.3:551.579.2

Tonning, Kristian, **Nevada utilizes modern methods in forecasting runoff from snow cover.** *Civil Engineering*, 19(10):22–23, Oct. **1949.** 6 photos. **DLC**—Popular, illustrated article on methods devised by J. E. Church. *Subject Headings:* **Snow melt, Runoff, Hydrologic forecasting.**

6–78 551.509.3:551.579.2

***Progress in snowmelt investigations at the Fraser Experimental Forest. The 1948 snowmelt season.** *U. S. Dept. of Agriculture, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado, Report No. 1*, Nov. **1949,** 65 p., charts, 6 photos, tables, 11 refs., 6 append. **DWB**—A technical report on the results of five projects conducted during 1948 at the Fraser Experimental Forest in Colorado for the purpose of making better forecasts of runoff from snow melt. Projects comprised: performance of Weather Bureau Sacramento type shielded storage gage, interpretation of degree-days above 32°F. derived from daily maximum and minimum temperatures, analysis of rates of snow melt, calculation of evaporation losses from the snow blanket, and forecasting the rate of runoff from snow melt hydrograph. Detailed data on hourly wind, humidity, evaporation, temperature and runoff presented. The bulk of the report consists of graphs, nomograms, charts and tables. *Subject Headings:* **Snow melt, Hydrologic forecasting, Snow gages, Evaporation from snow, Colorado.**—*M.R.*

6–79 551.579.4:523.74

Steinhauser, F., **Ergänzung zur Mitteilung über die Sonnenflecken und die Seespiegelschwankungen des Viktoriasees.** [Completion of communication on sunspots and variations of level of Lake Victoria.] *Wetter und Leben*, 1(12):357–359, March **1949.** 2 figs. **MH-BH**—Correlation of +.87 in 1899–1921 fell to +.31 in 1922–1943. *Subject Headings:* **Water level variations, Sunspots, Lake Victoria, Africa.**—*C.E.P.B.*

6–80 551.510.42:551.577:551.579.4

Steinhäusser, Hans, **Zur Frage der Reduktion von Reihen der Gebiets-Niederschlags- und Abflusshöhe.** [On the question of the reduction of series of regional rainfall and runoff amounts.] *Meteorologische Rundschau*, 2(11–12):325–326, Nov.–Dec. **1949.** 2 tables, 7 refs. **DWB**—Synchronous annual rainfalls and runoffs of neighboring river basins are nearly proportional, and this permits short periods of observations to be reduced to longer periods. Examples given. *Subject Headings:* **Precipitation, Runoff.**—*C.E.P.B.*

## CLIMATOLOGY AND BIOCLIMATOLOGY

### CLIMATOLOGY

6–81 551.58 551.583.2:551.311.2

†***Glaciers and climate; geophysical and geomorphological essays dedicated to Hans W:son Ahlmann, 14 November 1949.** *Geografiska Annaler*, 31(1–4), **1949.** 383 p. **MH-BH**—In commemoration of the 60th birthday of Hans W:son Ahlmann, 33 well-known authors in 11 countries contributed articles on various phases of climatology and glaciology. The edition may be had in the regular binding of the Geografiska Annaler, or with a special binding so it may be treated as a book. There are hundreds of figures and tables, and many fine photographs of glaciers. The papers, written in either English, French or German by writers in Austria, Canada, Denmark, Finland, France, Germany, Great Britain, Iceland, Norway, Sweden and the United States, cover the subjects of climatic change, polar ice, snow cover, tree-growth, river patterns, atmospheric and oceanic circulation, continentality, geomorphology, solar variability, volcanology, etc., in relation to glaciation in various parts of the world. The first article is a tribute to Ahlmann by Kirwan, Mannerfelt, Rossby and Schytt, giving an account of the investigations and contributions by Ahlmann in the fields of glaciology

and climatology during the past 30 years. The separate papers are analyzed individually in this and other issues of Meteorological Abstracts and Bibliography. Therefore it will suffice to list the author and title of each, with a reference to the number of any abstract already published. Items with a 6- are in this issue.

Ångström, A.: **Atmospheric circulation, climatic variations and continentality of climate.**
Baulig, H.: **Causalité et finalité en géomorphologie.**
Blanchard, R.: **Le problème du Témiscamingue.**
Brooks, C. E. P.: **Post glacial climatic changes in the light of recent glaciological research.** 6–89.
Defant, A.: **Konvektion und Eisbereitschaft in Polaren Schelfmeeren.**
Eythorsson, J.: **Temperature variations in Iceland.** 6–58.
Flint, Foster R.: **Pleistocene drainage diversions in South Dakota.**
Helland-Hansen, B.: **Remarks on some variations in atmosphere and sea.**
Hjulström, F.: **Climatic changes and river patterns.**
Hustich, I.: **On the correlation between growth and the recent climatic fluctuation.**
Kirwan, L. P., Mannerfelt, C. M:son, Rossby, C. G., and Schytt, V.: **Glaciers and climatology; Hans W:son Ahlmann's contribution.**
Klein, G. J.: **Canadian survey of physical characteristics of snow-covers.**
Landsberg, H.: **Climatic trends in the series of temperature observations at New Haven, Connecticut.** 6–59.
Leighly, J.: **On continentality and glaciation.**
Lewis, W. V.: **Glacial movement by rotational slipping.**
Liljequist, G. H.: **On fluctuations of the summer mean temperature in Sweden.** 6–56.
Lundqvist, G.: **The orientation of the block material in certain species of flow earth.**
Manley, G.: **The snowline in Britain.**
Mannerfelt, C. M:son: **Marginal drainage channels as indicators of the gradients of quaternary ice caps.**
de Martonne, E.: **La dyssymétrie des glaciations régionales et ses facteurs.**
Nilsson, E.: **The pluvials of East Africa.**
Noe-Nygaard, A.: **Samples of volcanic rocks from the sea bottom between the Faroes and Iceland.**
Petterssen, S.: **Changes in the general circulation associated with the recent climatic variation.** 5–11.
Schou, A.: **Danish coastal cliffs in glacial deposits.**
Schytt, V.: **Re-freezing of the melt-water on the surface of glacier ice.**
Seligman, G.: **Research on glacier flow.**
Sverdrup, H. U.: **Theoretical tools in geophysics.**
Sölch, J.: **Über die Schwemmkegel der Alpen.**
Thorarinsson, S.: **Some tephrochronological contributions to the volcanology and glaciology of Iceland.**
Troll, C. and Wien, K.: **Der Lewisgletscher am Mount Kenya.**
Wallén, C. C.: **The shrinkage of the Kårsa Glacier and its probable meteorological causes.**
Werenskiold, W.: **Glacier measurements in the Jotunheim.**
Willett, H. C.: **Solar variability as a factor in the fluctuations of climate during geological time.** 6–87.

*Subject Headings:* **Climatic changes, Glaciers.**—*M.R.*

6–82 551.58(02)

Klado, T. N., **Klimat ego znachenie i metody izucheniia.** [Climate, its importance and methods of investigation.] Leningrad, Gidromet. Izdat., **1949.** 86 p., 30 figs., 2 tables. (Biblioteka Gidrometnabliudatelia.) **DLC**—A modern, elementary text on physical and biological climatology. One of a series of manuals prepared under the editorship of S. A. Sapozhnikova and entitled *Biblioteka Gidrometnabliudatelia*, or "Hydrometeorological Observers Library." Contains eight chapters, discussing in a popular style the following: (1) Concept of climate, (2) Climatic controls, (3) Climatic classification, (4) Micro- and local climates, (5) How to study climate, (6) Climate and life, (7) Does climate change? (8) Importance of

climatic investigations for human activity. Contains many simple tables, graphs, schematic diagrams and other illustrations (photos). *Subject Headings:* **Climatology, Textbooks, U.S.S.R.**—*M.R.*

6–83 551.58(02)

Miller, Arthur Austin, **Climatology.** 3rd ed. rev. enl. London, Methuen, [1944]. 325 p., 82 figs., tables, 36 refs. **DLC**—The present edition contains a large amount of useful information on the climates of the various parts of the world in addition to discussions of various aspects of climatology: the meaning and scope of climatology, climatic elements, climatic influences, climatic changes, microclimates, climate and life, etc. A chapter on air masses and fronts in relation to climate, coming before the discussion of climatic classifications, is unusual in a geographers textbook on climatology. The remainder of the book is divided into separate chapters on the equatorial, tropical, monsoon, temperate, cold, arctic, desert and mountain climates, with illustrative data and charts from various parts of the earth, and references to enable the student to do further reading. *Subject Headings:* **Climatology, Textbooks.**—*M.R.*

6–84 551.582:551.506.8(47)

Rubtsov, N. I., **Zimnie i vesennie fenologicheskie nabliudeniia v pustyne Betpak-dala.** [Winter and spring phenological observations in the Betpak-dala desert.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Izvestiia,* 78(4):413–420, **1946.** table, 3 refs. **MH-BH, DWB**—Results of observations made from September 1940 through May 1941 at a point in the Betpak-dala desert (in the central part of Kazakhstan) by the Kazakh branch of the Academy of Sciences (Akademiia Nauk, SSSR). Characteristics of temperature, precipitation, snow cover and wind are discussed by months. In addition a table of phenological observations made in the spring of 1941 is given. It is interesting to note that the winter was not as severe as expected, and that the prevailing easterly winds drifted snow to a depth of 1 m. or more on the westerly sides of the valleys, leaving almost bare ground elsewhere. *Subject Headings:* **Climatology, Phenology, Kazakhstan, U.S.S.R.**—*M.R.*

## CLIMATIC CHANGES

6–85 551.583:551.588.1

†*Loewe, F., **A contribution to the study of the variability of meteorological elements in the subtropical and temperate latitudes of the Southern Hemisphere.** *Australia Meteorological Branch, Bulletin* No. 39, p. 37–49, **1948.** 2 figs., 19 tables, 44 refs. **DWB**—Extreme variability in summer of interdiurnal temperatures, diurnal temperature ranges, average monthly temperature, relative humidity, cloudiness, sunshine, and monthly rainfall analyzed for Australia, New Zealand and adjacent oceanic areas; leading to the conclusion that phenomena is not due to continental-oceanic influences, but to the normal planetary influence of crowded isotherms (steepened meridional temperature gradient) over a water-covered hemisphere, which is masked in Northern Hemisphere by large areas of land. Excellent bibliography. *Subject Headings:* **Climatic variations, Planetary influences, Continentality, Southern Hemisphere.**—*M.R.*

6–86 551.583.14

†Lysgaard, Leo, **Recent climatic fluctuations.** *Folia Geographica Danica,* Vol. 5, **1949.** 86 p. (text). 94 p. (258 tables), 35 p. (91 figs.), 15 p. (comprehensive biblio.). **DLC**—A most comprehensive study of climatic changes since 1798. For a large number of stations in all parts of the world, overlapping or decadal 30 year means of temperature, precipitation, pressure, pressure gradient, gradient wind and wind, are shown in tables and curves; sunspot numbers are treated in the same way. World charts show differences of temperature, precipitation and pressure, 1911–1940 minus 1881–1910, for January, July, and year, and temperature anomalies for some outstanding periods. The text discusses the relations between changes in different regions and some correlations with sunspots; the conclusion is that "although there is much to suggest that the present climatic fluctuation is due to fluctuations of solar radiation, . . . the cause will remain open until sufficiently exact measurements for a longer time of the solar radiation are available." There is a comprehensive bibliography (15 pages) of climatic changes

mainly in the historical period. *Subject Headings:* **Climatic changes, Sunspots, Historical climates.**—*C.E.P.B.*

6–87 551.583:523.74

Willett, H. C., Solar variability as a factor in the fluctuations of climate during geological time. *Glaciers and Climate. Geografiska Annaler*, 31(1–4):295–315, **1949.** 11 figs., 18 refs. **MH-BH**—A summary of glacial and post-glacial changes of climate shows that amplitude of oscillations increases with their length. All long-period climatic oscillations are world-wide and have been basically similar, consisting of a swing between high-index and low-index patterns of zonal circulation. This suggests that the same factor has been in operation throughout. Theories of glacial fluctuations and their difficulties are next discussed; the hypothesis of solar variability is supported by the relation of recent weather patterns to the sunspot cycle and to disturbances of the ionosphere; these are illustrated by world charts. *Subject Headings:* **Climatic variations, Sunspots, Solar influences.**—*C.E.P.B.*

6–88 551.583.14

Schove, D. Justin, **The climatic fluctuation since A.D. 1850 in Europe and the Atlantic.** *Royal Meteorological Society, Quarterly Journal*, 76(328):147–165, April **1950.** 7 figs., 10 tables. **DWB**—Curves of overlapping 30-year means of temperature, pressure and rainfall for eastern North Atlantic and Europe are interpreted as southward drift of a circumpolar ring of high pressure which left Arctic circle about 1880 and reached 22½°N. about 1915. World charts show decades of maximum pressure and minimum temperature. At any one place the sequence is: first frontal stage, easterly or cold period, pressure maximum, westerly period, second frontal stage. Rainfall fluctuations are due to a combination of an "areal" term representing pressure anomaly and a "local" term representing vector wind anomaly (maximum rainfall with east winds to east of high ground, with west winds to west). The sequence of the five stages can be followed in climatic fluctuations in British Isles 1875–1925, Scandinavia 1865–1915, Italy 1885–1935 and U.S.A. 1895–1945. Climatic fluctuations before 1850 are briefly analyzed on the same lines. *Subject Headings:* **Climatic variations, Great Britain, Scandinavia, Italy, United States.**

6–89 551.583.2:551.513.1

Brooks, C. E. P., **Post-glacial climatic changes in the light of recent glaciological research.** *Glaciers and Climate. Geografiska Annaler*, 31(1–4):21–24, **1949. MH-BH**—Author shows that during periods of general advance of glaciers since 14th century, winds in England were variable, but during periods of retreat they were southwesterly and steady. Advection of warm air causes retreat. Hypothesis is advanced that the "pool" of cold air over Arctic ice-cap plays no direct part in atmospheric circulation but by displacing Arctic front causes advanced or withdrawn positions of ice-cap to be persistent. *Subject Headings:* **Climatic changes, Historical climates, Atmospheric circulation.**—*C.E.P.B.*

6–90 551.584:551.588.6(437)

Uhlíř, Pavel, **Větrolamy v Československé Republice. (Zpráva o anketě Československé Akademie Zemědělské.)** [The protective tree belts in the Czechoslovak Republic. (Remarks on the questionnaire of the Agricultural Academy of Czechoslovakia.)] *Meteorologické Zprávy*, 3(4–5):72–74, Feb. **1950. MH-BH**—The author reviews the history of attempts to influence the local climate by means of shelter belts, beginning as far back as 1000 B.C. At present extensive projects are being carried out in many places, especially in the U.S.S.R. Photographs of several kinds of protective tree belts, and graphs showing effect of belts on air and soil temperature at eight places in Czechoslovakia (July and Aug. 1949), are included. *Subject Headings:* **Microclimatology, Soil temperatures, Shelter belts, Agricultural climatology, Czechoslovakia.**—*M.R.*

## BIOCLIMATOLOGY—APPLIED CLIMATOLOGY

6–91 551.586:57

Blockley, W. V., and Taylor, Craig L., **Human tolerance limits for extreme heat.** *Heating, Piping and Air Conditioning*, 21(5):111–116, May **1949.** 3 figs., 3 tables, 10 refs. **DWB**—

Experiments on two men with temperatures from 140° to 240°F. give high correlations between air temperature, exposure time and skin temperature, heart rate, weight loss and expired air temperature. Curves show relation between index of physiological strain and other factors. *Subject Heading:* **Medical meteorology.**

6–92 551.586:59

Burnett, Thomas, **The effect of temperature on an insect host-parasite population.** *Ecology*, 30(2):113–114, April 1949. 7 figs., 15 tables, 15 refs. **DLC**—Studies on the population increase of Trialeurodes vaporariorum and its internal chalcid parasite, Enearsia formosae, at various temperatures 25°C. optimum for host and parasite. Lower temperature for host. Higher temperature for parasite. *Subject Heading:* **Ecoclimatology.**

6–93 551.586

Gallistl, H., **Verlauf der Tagestemperatur, beobachtet an einer Pflanze mit Nischenblättern.** [Variation of day temperature in a plant with niche-leaves.] *Wetter und Leben*, 2(3–4):69–70, [June]–July 1949. table. **MH-BH**—Gives bi-hourly temperatures in the space between leaves in a Cos lettuce on a hot dry day, and nearby air temperatures. *Subject Heading:* **Agricultural climatology.**—*C.E.P.B.*

6–94 551.586:61

Lee, Douglas H. K., and Lemons, Hoyt, **Clothing for global man.** *Geographical Review*, 39(2):181–213, April 1949. 6 figs., table, refs. **DLC**—Treats of the thermal, mechanical, psychological and biological aspects of wind chill; the effect of radiation, conduction, convection evaporation; arctic clothing, tropical clothing, condensation and wet-cold. Discusses the vapor-barrier principle, clothing almanacs, and need for improvement of climatic data. *Subject Headings:* **Bioclimatology, Medical meteorology, Clothing requirements.** –*M.R.*

6–95 551.586:612

Lehmann, P., **Das subjektive Bioklima.** [Subjective bioclimate.] *Wetter und Klima*, 2(3–4):69–75, March–April 1949. 11 refs. **DWB**—A discussion from medical point of view. Different men, and same men at different times, react differently to heat, humidity etc., and feel different sensations. Bioclimatic research is often concerned with this subjective climate and only incidentally with objective climate. Weather complexes, e.g., effect of thunder on heart, are discussed. *Subject Headings:* **Bioclimatology, Physiology.**—*C.E.P.B.*

6–96 551.587:551.524.7:551.555.1

Emon, J., **L'inversion de l'alizé dans l'Océan Indien Sud-Ouest.** [Trade wind inversions in the Southwest Indian Ocean.] *La Météorologie*, 4e série, No. 14:73–83, April–June 1949. 4 figs. Summary in French and English p. 73. **DWB**—Discussion of data obtained from wind, temperature and humidity soundings during 1943 to 1945 at Diego-Suarez, Plaisance-Maurice and Tuléar. Monthly mean height of inversion ranges from about 1.5 km. in the warm season (Jan.–March), to about 3.0 km. in the cold season (July–Sept.); whereas, the frequency of the trade inversion varies from about 0% in the warm season to nearly 100% in the cold. Monthly height, frequency and thickness of inversion and increase in temperature given in graphic form. *Subject Headings:* **Upper air climatology, Inversions, Trade winds, Indian Ocean.**—*M.R.*

## MISCELLANEOUS APPLICATIONS

### SOLAR INFLUENCES

6–97 551.590.21:551.521.1:634

Vercelli, Francesco, **Periodicità dendrologiche e cicli solari.** [Dendrological periodicity and solar cycles.] *Annali di Geofisica*, 2(4):477–485, Oct. 1949. 3 figs., 4 refs. **MH-BH**—The author has made a periodic analysis of a 2,000 year record of growth of Sequoia (taken from Douglass, *Tree Ring Bulletin*), and claims that the eleven year cycle found in the tree-ring growth is in phase with the solar cycle and can be used to identify the position of the solar cycle in long records of plant growth. *Subject Headings:* **Periodicities, Tree ring growth, Solar cycle.**—*M.R.*

## OPTICAL PHENOMENA

6–98 551.593.

Brocks, Karl, **Die terrestrische Refraktion in polytropen Atmosphären.** [Terrestria refraction in polytrope atmospheres.] *Deutsche Hydrographische Zeitschrift*, 2(5):199–211 Oct. **1949.** fig., 3 tables, 19 refs., 17 equations. Summary in German and English p. 199 **DWB**—Limits of accuracy determined for calculation of curvature of light ray at any give point in atmosphere, considering normal variations in meteorological elements. A practica method for calculating refraction developed and compared with methods of Jordan, Hunte and Von Brunn. Examples of its use under extreme conditions at Agra (7 cases) cited. *Sub ject Headings:* **Refraction of light, India.**—*M.R.*

6–99 551.593.5

Simmons, R. E. G., **Green flash off San Diego, California.** *Marine Observer*, 20(147) 10–11, Jan. **1950.** 10 figs. **DWB**—Unusually fine occurrence lasting four seconds. *Subjec Heading:* **Green flash.**

6–100 551.593.54

Kaempfert, Wolfgang, **Nomogramme für den Trübungsfaktor.** [Nomogram for th turbidity factor.] *Meteorologische Rundschau*, 1(7–8):215–218, Jan.–Feb. **1948.** 6 figs., tables, 12 refs., 10 equations. Summary in German and English p. 215. **DLC**—*Subjec Headings:* **Turbidity, Nomograms.**

6–101 551.593.54

Siedentopf, Heinrich, **Untersuchungen zur atmosphärischen Trübung. I, Leuchtdichte und Farbe des Himmels im Zenit.** [Investigations on atmospheric turbidity. I, Ligh intensity and color of the sky at the zenith.] *Meteorologische Rundschau*, 1(17–18):524–527 Nov.–Dec. **1948.** 6 figs.. 2 tables, 8 refs. **DWB**—*Subject Headings:* **Turbidity, Twilight phenomena.**

6–102 551.593.653

Dobson, G. M. B., **Luminous night clouds.** *Meteorological Magazine*, [London] 79(933):87–88, March **1950.** Discussion, J. Paton, *idem*, p. 88. **DWB**—*Subject Heading* **Noctilucent clouds.**

## ELECTRICAL PHENOMENA

6–103 551.594(02)

†Chalmers, John Alan, **Atmospheric electricity,** Oxford, Clarendon Press, **1949.** 175 p. 36 figs., tables, 248 refs., equations, append. **DLC**—A well annotated, illustrated and indexed treatment in book form of the main aspects of atmospheric electricity with the exception of cosmic radiation, ionospheric exploration by radio, or earth currents. Full consideration is given to the electricity of thunderstorms and precipitation, the ionization and conductivity of the atmosphere, point discharges, separation of charges. A six page bibliography lists 248 works. The history of research on atmospheric electricity and the fundamental theories are given in the first two chapters. *Subject Headings:* **Atmospheric electricity, Textbooks.**—*M.R.*

6–104 551.594.11:551.46

Mironov, A. T., **Morskie izmeritel'nye elektrody.** [Electrodes for measurement of electric currents in the sea.] *Akademiia Nauk, SSSR, Doklady*, 70(5):825–827, **1950.** 2 tables, 6 refs. **DLC**—Research on potential gradient in sea or ocean currents began in 1935. Tests were made with various kinds of electrodes (copper, steel, zinc, aluminum and lead). Tests showed that lead electrodes in $PbSO_4$ gave best results. Data given in tables. *Subject Headings:* **Potential gradient, Oceanography.**—*M.R.*

6–105 551.594.221

Foster, Hal, **An unusual observation of lightning.** *American Meteorological Society Bulletin*, 31(4):140–141, April **1950.** **DWB**—Near the Mariana Islands during the spring of

1945 flashes were observed at regular intervals of nine to eleven seconds for 30 minutes coming from two tenuous chimney shaped clouds three miles apart (top of one 8,100 ft.) and only 300 to 500 feet in diameter. Freezing level was above 15,000 feet. *Subject Headings:* **Lightning, Thunderstorm electricity.**—*M.R.*

6–106 551.594.221

Norinder, Harald, **Duration of lightning strokes and occurrence of multiple strokes.** *Tellus*, 2(1):24–34, Feb. 1950. 19 figs., 4 refs. **DWB**—Variations in duration of number of and time interval between lightning strokes are studied by means of electromagnetic records made at some distance from the strokes. This method is considered superior to the former method of photographing strokes to a tall building or similar object in or out of the laboratory, as the presence of the object materially alters the electromagnetic field of the earth and cloud. Graphs and histograms show frequencies of measured variations; many actual records of successive lightning strokes are reproduced. It is stated that, owing to lower thermodynamic intensity in high latitudes lightning strokes are less intense than in lower latitudes. *Subject Headings:* **Lightning, Thunderstorm electricity, Sferics, Sweden.**—*M.R.*

# PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON VOLCANIC DUST

By: *Harris P. Kramer*

## EXPLANATORY NOTE

The following bibliography contains some of the most important references to major volcani eruptions, and to the optical and meteorological phenomena which accompanied them.

The material has been grouped chronologically according to the particular outbreak, and ar ranged alphabetically by author within each group. The first section, however, covers the mor general treatises or aspects of volcanic dust and its effect on radiation, climate and optical phenomena

The bibliography is not intended to be exhaustive, but rather representative and should lea the reader to the most significant sources of material on the subject. Good bibliographic source have been designated with the customary dagger (†), and no attempt has been made to search an analyze these almost inexhaustible sources of references.

Although no references have been included to the June 1950 eruption of Mauna Loa, Hawai and the subsequent "dust veil," over the Pacific we should like, at least, to call attention to thi most recent phenomena, probably due to volcanic dust, reports of which have appeared in June edi tions of the newspapers of the country.

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## BIBLIOGRAPHY ON VOLCANIC DUST

### VOLCANIC DUST AND ITS EFFECTS ON RADIATION AND CLIMATE

**F–1** 551.510.423:551.521.1:551.583

Abbot, C. G. and Fowle, F. E., **Volcanoes and climate.** *Smithsonian Miscellaneous Collections* 60, No. 29, March 1913. 24 p. 3 figs., 6 tables, refs. **DLC**—Effects given of the haze believed to have resulted from the Katmai eruption, June, 1912, on the quantity and quality of solar radiation as determined by measurements, and also the effect which the presence of the haze and that o similar occurrences in former years (including Krakatoa) appears to have had on the climate of the earth. *Subject Headings:* **Volcanic dust, Solar radiation, Climatic variations, Katmai, Krakatoa.**

**F–2** 551.510.423:551.521.1:551.583

Abbot, C. G., **Do volcanic explosions affect our climate?** *National Geographic Magazine* 24:181–198, 1913. diagr., photos, tables, ref. **DWB**—General popular article discussing numerous volcanic eruptions (from Hecla, Iceland, 1783, to Katmai, 1912), which had ejected vast quantities of volcanic dust into the atmosphere. Diagram shows variations in solar radiation and in earth's temperature: 1880–1910. Author believes volcanic dust does influence climate. *Subject Headings* **Volcanic dust, Climatic variations, Solar radiation.**

F–3 551.510.423:551.521:551.583

†Arctowski, Henryk, **Volcanic dust veils and climatic variations.** *New York Academy of Science, Annals*, 26:149–174, **1915.** 7 figs., 3 tables, 79 refs. **DLC**—The hypothesis attributing most climatic variations to volcanic dust veils is presented as a matter of theoretical interest. Numerous references to violent eruptions and subsequent atmospheric dust observations, particularly those affecting radiation, are given and briefly discussed. References to 1883 eruptions of Krakatoa and Aleutian volcanoes; to 1901–1904 eruptions of Mt. Colima, Mexico, Pelée, and others; and 1912, Katmai. Brief discussion and references to atmospheric circulation of hemispheres. Pike's Peak temperature records for years 1874–1887 are given; compared to temperature records at Port Darwin, Australia, Batavia, Singapore, India, and Aden. 1900–1911, 1909–1913 temperatures also noted. Relation between sunspots and temperatures investigated. Graph shows relation between temperature and volcanic activity, 1821–1900. *Subject Headings:* **Volcanic dust, Solar radiation, Climatic variations, Sunspots, Krakatoa, Pelée, Katmai.**

F–4 551.558(09) 551.510.423:551.583

†Brooks, C. E. P., **Climate through the ages: a study of the climatic factors and their variations.** 2nd ed., completely rev. New York, McGraw-Hill, **1949.** 395 p. 39 figs., 31 tables, refs. (at end of chapters), equations, 2 append. **MH-BH**—Abstract 3–121 in Meteorological Abstracts and Bibliography, 1(3):168–169, March 1950. References made to the effect of volcanic dust on climate variations in various sections of book as indicated in index. *Subject Headings:* **Volcanic dust, Climatic variations.**

F–5 551.510.423:551.583

Brooks, Charles F., **Volcanoes and climate.** *Science, New Series*, 38:520–521, **1913. DWB**—Comment on volcanoes and climate variations with reference to work and theories of Abbot, Fowle, Kimball, Ångström and Humphreys. Considers theories plausible and applicable. *Subject Headings:* **Volcanic dust, Climatic variations.**

F–6 551.510.423

†Davis, R. O. E., **The haze of the upper atmosphere.** *Mount Weather Observatory, Bulletin*, 5:313–318, **1913.** refs. **DWB**—General article on all kinds of dust in the atmosphere including volcanic; no data; but numerous specific references. *Subject Heading:* **Volcanic dust.**

F–7 551.593.55:551.593.54:551.510.42

†*Gruner, P., **Beiträge zur Kenntnis der Dämmerungserscheinungen und des Alpenglühens. I. Historisch chronologische Übersicht der schweizerischen Beobachtungen und Veröffentlichungen über Dämmerungsfärbungen und Alpenglühen.** [Contributions to information on twilight phenomena and Alpenglow. I. Historical chronological survey of Swiss observations and publications on twilight color and Alpen glow.] *Schweizerische Naturforschende Gesellschaft, Denkschriften*, Vol. 57, **1921.** 245 p. 39 tables, extensive refs. (p. 234–245). II. **Historisch-chronologische Übersicht der ausser schweizerischen Beobachtungen und Veröffentlichungen über Dämmerungen, atmosphärisch-optische Störungen und andere damit verwandte Erscheinungen.** [II. Historical, chronological survey of observations and publications outside of Switzerland, on twilight, atmospheric optical disturbances and other related phenomena.] *Idem*, Vol. 62, mem. 1, **1925.** 190 p. tables, extensive refs. (p. 158–190). **DWB**—Thorough and exhaustive work containing extensive observational data and theoretical analysis for various periods of atmospheric turbidity by sections: before 1883; 1883–1886; 1887–1901, 1902–1904, 1905–1911; 1912–1913; 1914–1920. Part II is divided in similar manner with a section added surveying the 1920–1924 period. *Subject Headings:* **Optical phenomena, Alpenglow, Volcanic dust.**

F–8 551.593.55:551.510.423

†Gruner, P. and Kleinert, H., **Die Dämmerungserscheinungen.** [Twilight phenomena.] *Probleme der Kosmischen Physik.* Hamburg, Henri Grand, **1927.** 124 p. 30 figs., 6 colored plates, 11 tables (appended), refs. (p. 118–120). **DLC—Die Schwankungen des Dämmerungsverlaufes in ihren geophysikalischen, meteorologischen und kosmischen Beziehungen.** [The variations of twilight occurrences in their geophysical, meteorological, and cosmic aspects.] Chap. II, p. 67–87. Atmospheric turbidity (after volcanic eruptions which caused sunset phenomena) treated by periods. Period prior to 1883 is discussed giving references to various significant accounts. Krakatoa period, 1883–1886; Pelée, 1902–1904; Vesuvius, 1908; Halley's comet, 1910; Katmai, 1912–1914; and the years 1916–1920. Secular variations in twilight phenomena and sunspots, considered; yearly period of purple light; cosmic influences. *Subject Headings:* **Optical phenomena, Volcanic dust.**

F–9 551.510.423:551.525:551.583

Hanna, H. C., **Effect of volcanic dust on earth temperatures.** *Volcano Letter, Hawaiian Volcano Observatory, No. 307*, Nov. **1930.** 2 photos, 3 refs. **DWB**—General comprehensive work summariz-

ing other work rather than presenting original data. Speed of the spread of Katmai dust over the globe in different directions is calculated. Explanation of how calculations are made. Optical phenomena particularly noted as well as temperature changes. Brief discussion of other eruptions and attending optical and temperature consequences as well as of theory of volcanic activity and climatic variations. *Subject Headings:* **Volcanic dust, Climatic variations, Earth temperatures.**

**F–10** 551.510.423:551.521:551.583

*Humphreys, William J., **Volcanic dust and other factors in the production of climatic changes and their possible relation to ice ages.** *Mount Weather Observatory, Bulletin*, 6:1–34, **1913.** 5 figs., 4 tables, refs., equation. **DWB**—Detailed theoretical article citing various eruptions. It is shown that volcanic dust in upper atmosphere decreases solar radiation and lowers earth temperature. Records show this dust to have been of great importance in climatic changes. *Subject Headings:* **Volcanic dust, Climatic variations, Solar radiation.**

**F–11** 551.510.423:551.583

Humphreys, W. J., **Volcanic dust in relation to climate.** *American Geophysical Union, Transactions*, 15:243–245, **1934.** **DWB**—Author claims records since 1750 show that following volcanic explosions, which have ejected large amounts of dust into the upper atmosphere, temperatures have been consistently lower than normal for the next one to three years. He stresses the possible relation between such atmospheric turbidity and glacial periods. *Subject Headings:* **Volcanic dust, Climatic variations.**

**F–12** 551.510.423:551.521

Humphreys, W. J., **The greenhouse effect of volcanic dust.** *Monthly Weather Review*, 65:261–262, **1937.** refs., equations. **DLC**—Coarse flat-shaped dust as might have come from Iceland, 1783, shuts in earth radiation and causes warmer temperature, as were recorded in Europe, summer of 1783. Fine volcanic dust, on the other hand, such as that from Asamayama, Japan, after its 1783 eruption shuts out solar radiation more effectively than it shuts in earth radiation and causes some decrease of surface temperatures. Equations given showing relations between incoming and out-going radiation. *Subject Headings:* **Volcanic dust, Radiation.**

**F–13** 551.510.423:551.583:551.521

†*Humphreys, W. J., **Vulcanism: Theory,** Part V, Chap. III. **Vulcanism: observational,** Chap. IV. (In his **Physics of the air.** New York, McGraw-Hill, **1940.** p. 587–618. figs., tables, refs.) **DLC**—Contents: Gaseous contribution to the atmosphere. Dust in the upper atmosphere. Physical structure of the atmosphere. Size of volcanic dust particle. Time of fall. Action of dust on solar and terrestral radiation. Number of dust particles. Temperature correction due to dust radiation. Total quantity of dust. Effect of dust on interzonal temperature. Pyrheliometric records. Relation of world temperatures to pyrheliometric values. Temperature variations since 1750 as influenced by sunspots and volcanic eruptions. Volcanic disturbances of atmospheric temperature since 1750, etc. *Subject Headings:* **Volcanic dust, Climatic variations, Radiation.**

**F–14** 551.510.423:551.583 551.590.21

Huntington, Ellsworth, **The climatic factor as illustrated in arid America.** Washington, D. C., Carnegie Institution, **1914.** 341 p. **DWB**—Pages 150–151, 274, 286–287. Contain discussion of volcanic activity and dust as a factor in climate change. Author mentions "convincing" theories of Abbot, Fowle, Humphreys, and Arctowski, but also holds to own theory of sunspot factor in earth's climate changes. Gives occasions in geologic history in which volcanic activity was widespread and seemed significant to climate. *Subject Headings:* **Volcanic dust, Climatic variations, Sunspots.**

**F–15** 551.510.42:551.521.1

Kimball, H. H., **Volcanic eruptions and solar radiation intensities.** *Monthly Weather Review*, 46:355–356, **1918.** fig., table, refs. **DWB**—Curves show variations in the annual mean values of solar radiation intensity over the world 1883–1918. Definite depressions mark the great volcanic eruptions of the period. *Subject Headings:* **Volcanic dust, Solar radiation.**

**F–16** 551.510.42:551.521.1

†*Neuberger, Hans, **Studies in atmospheric turbidity in central Pennsylvania.** *Pennsylvania State College Studies, No. 9,* **1940.** 36 p. 17 figs., 17 tables, 29 refs. **DLC**—From author's summary: Observations covering a wide range of solar elevation have permitted, for the first time, a comparison of the true amplitude of Arago's curve with other known criteria of atmospheric turbidity as derived from Arago's curve. This investigation leads to the conclusion that for information on atmospheric impurity in normal times the observation of the position of Arago's point at 10° solar elevation is sufficient. Among many types of observations the influence of increased solar activity

and volcanic eruptions upon atmospheric turbidity has been investigated. *Subject Headings:* **Solar radiation, Volcanic dust, Arago's point.**

**F–17** 551.521:551.510.42

†Neuberger, Hans, **Arago's neutral point: a neglected tool in meteorological research.** *American Meteorological Society, Bulletin,* 31(4):119–125, April **1950.** 5 figs., 5 tables, 18 refs. **DWB**—Nature and principles of Arago's neutral point of atmospheric polarization are explained. Various criteria of atmospheric turbidity that can be derived by neutral point observations, their merits, usefulness and potentialities, are discussed. In particular, the influence of the size of the particles polluting the atmosphere and of meteorological factors on spectral observations of Arago's neutral point is shown. Problems are presented. Reference is made to observations made after Katmai eruption, 1911 to 1913. *Subject Headings:* **Arago's point, Radiation, Turbidity, Katmai.**

**F–18** 551.521:551.510.42

*Zenger, K. W., **Die Lunisolare (Saros) Periode des Wetters und der grossen Erdstörungen,** 1887–1905. [The lunisolar (Saros) periods of the weather and the great earthquakes, 1887–1905.] Prague, Karl Reyl, **1905.** 174 p. *Subject Headings:* **Periodicities, Turbidity.**

## ICELAND, 1783

**F–19** 551.510.423:551.593.55

Kiessling, J., **Die angeblich im Jahre 1783 beobachteten Dämmerungserscheinungen.** [The alleged twilight phenomena observed in the year 1783.] *Meteorologische Zeitschrift,* 2:230–232, **1885. DLC**—Correspondence and Notes. Observations which were made at meteorological stations of sunset phenomena after Iceland eruptions, are reprinted from the original source, the Ephemerides, Societas Meteorologica Palatina. *Subject Headings:* **Volcanic dust, Twilight phenomena, Iceland.**

**F–20** 551.510.423:551.593

Traumüller, F., **Die trockenen Nebel, Dämmerungen und vulkanischen Ausbrüche des Jahres 1783.** [The dry fog, sunsets, and volcanic eruptions of the year 1783.] *Meteorologische Zeitschrift,* 2:138–140, **1885.** 3 refs. **DLC**—Analogy noted between twilight phenomena of 1883 and those of 1783 at time of eruptions in Iceland. Describes eruptions in Iceland and subsequent phenomena as observed in Europe 1783. *Subject Headings:* **Volcanic dust, Optical phenomena, Iceland, Krakatoa.**

## KRAKATOA, 1883

**F–21** 551.510.423(923)551.593

Abbe, Cleveland, **Krakatoa dust versus Kratatoa vapor.** *Monthly Weather Review,* 34:163–164, **1906. DWB**—Author attributes optical phenomena after Krakatoa to minute vapor particles or "vapor dust," stating that mineral dust played only a minor role. Gives his explanations, observations, and analysis. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–22** 551.510.423(923)551.593

*Ascroft, William, **Catalogue of sky sketches from September 1883 to September 1886; illustrating optical phenomena attributed to the eruption at Krakatoa in the Java Straits, Aug. 27th, 1883.** London, Eyre and Spottiswoode, **1888.** 18 p. tables. **DLC**—Descriptive catalogue accompanying an exhibition of the sketches, which were made from nature by the author, of the sunsets and phenomena of those three years. Six of them were used as frontispiece for the Report of the Krakatoa Committee of the Royal Society. Tables relate dates, times, and brief descriptions of the sunset phenomena. (Sketches not included in the pamphlet.) Reference is made to such sunset phenomena occurring in 1783 after earthquakes in Sicily and Calabria. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–23** 551.510.423(923):551.593(265)

Bishop, S. E., **September stream of Krakatoa smoke at Strong's Island.** *Nature,* [London], 30:537, **1894. DLC**—Letter to the Editor. Account of optical phenomena at Strong's Island, lat. 5°N., long, 162°30′E., and at other points in the Pacific, and speculation on the travel of clouds of the Krakatoa dust. No tabulated data. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–24** 551.510.423(923):551.513

Bishop, Sereno E., **The equatorial smoke-stream from Krakatoa.** [1884.] 16 p. **DWB**—Theory presented on the rapid westward movement about the earth of the dust from Krakatoa eruption 1883. Independent current of the vapor itself suggested and explained. Smoke assumed to have risen 100 miles. *Subject Headings:* **Volcanic dust, Atmospheric circulation, Krakatoa.**

**F–25** 551.510.423(923):551.593

†Bishop, Sereno E., **The origin of the red glows.** Rochester, N. Y., *Warner Observatory, History and Work*, Vol. 1, p. 63–70, **1887.** table, refs. **DWB**—Phenomena described. Cause, (Krakatoa dust), analyzed. Table gives statement of earlier appearances of green suns and red glows over the world, along with extensive references to earliest original printed notations on the subject from different geographical areas. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa, History.**

**F–26** 551.510.423(923):551.513

Brooks, C. E. P., **The movement of volcanic dust over the globe.** *Meteorological Magazine*, [London], 67:81–86, **1932.** 2 figs., refs. **DWB**—Spread of the dust about the globe after the 1883 eruption of Krakatoa is described and analyzed, and charts constructed using principally data from the Report of the Royal Society. Isochrones of the spread of the main dust clouds and vivid sunset glows are shown in Fig. 1, as well as air movements at a height of between 20 and 30 km. Fig. 2 shows general movements of cirrus and cirrostratus clouds during Oct. to Dec. at height of about 8 to 11 km. Agreement in lines of the two figs. is apparent. Eruption of Katmai and Andes volcanoes also briefly mentioned, but not considered as significant as Krakatoa. *Subject Headings:* **Volcanic dust, Atmospheric circulation, Krakatoa, Katmai.**

**F–27** 551.510.423(923):551.593.55

Browne, T. M., **The sky-glows.** *Nature*, [London], 30:536–537, **1884. DLC**—Letter to the Editor. Detailed description of sunset phenomena, Sept. 20, 1884, over England. Typical example of many such reports, others of which are referred to in Report of Krakatoa Committee of Royal Society, see F–35. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–28** 551.510.423(923):551.593.55

†*Busch, Friedrich, **Beiträge zur Erkenntnis des Dämmerungs-Phänomens.** [Contributions to information about the twilight phenomena.] *Jahresbericht über das Königliche Laurentianum zu Arnsberg*, 1886–1887. Arnsberg, F. W. Becker, **1887.** p. 1–33. 10 tables, refs. **DLC**—Careful observations and analysis made of optical phenomena and their occurrence after Krakatoa eruption, 1883–1887. Theoretical work. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–29** 551.510.423(923):551.593.55

Clark, James E., **The recent sky-glows.** Rochester, N. Y., *Warner Observatory, History and Work*, vol. 1, p. 39–51, **1887.** 6 figs., 4 tables, refs. **DWB**—Analytical account of phenomena and their sequences, based on personal observations; connection with Krakatoa eruption explained. Counter-glow and other phenomena analyzed. Fig. shows optical effects. Spread of dust rapidly about earth, westward and northward, described. Estimated that finest dust may have reached height of 100 miles as result of: 1) constant uprush of erupted matter; 2) much reduced air resistance above four miles; 3) the uprush of the Trades (resulting in surface equatorial calms); 4) the consequent immense expansion of gases which must also increase the velocity of their outward flow. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–30** 551.510.423(923):551.593.55:551.513

Hazen, Henry A., **The sun glows.** *American Journal of Science*, 27:201–212, March **1884.** 3 tables, refs. **DLC**—Earliest appearances of phenomena listed at different points about world, Aug. 28 to Nov. 27, 1883. Description of phenomena as apparent in 1884. Vapor theory presented. Shown why "volcanic ashes" and "cosmic dust" hypotheses are untenable in respect to Krakatoa optical phenomena. *Subject Headings:* **Volcanic dust, Optical phenomena, Atmospheric circulation.**

**F–31** 551.510.423(923):551.593.55

Kiessling, J., **Die Dämmerungserscheinungen im Jahre 1883 und ihre physikalische Erklärung.** [The twilight phenomena in 1883 and their physical explanation.] Hamburg, Leopold Voss, **1885.** 53 p. 4 figs., refs.—One of the thorough original investigations of optical phenomena of the years after Krakatoa eruption. No tabulated data in this paper. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–32** 551.510.423(923):551.593

Kiessling, [J.], **On the cause of the remarkable optical atmospheric effects in 1883 and 1884.** Rochester, N. Y., *Warner Observatory, History and Work*, Vol. 1, p. 31–37, **1887.** fig. **DWB**—Translation from a German original by G. H. Haring. Description and explanation of the sunset phenomena caused by dust fogs from Krakatoa. Estimates that dust moved at speed of about 80 miles per hour. Gives brief explanation of spread. Discusses Bishop's Ring occurrences briefly and mentions other earlier eruptions from 44 B.C. to 1883 which caused remarkable optical effects. *Subject Headings:* **Volcanic dust, Optical phenomena, History, Krakatoa.**

**F–33** 551.510.423(923):551.593.55

*Kiessling, J., **Untersuchungen über Dämmerungserscheinungen zur Erklärung der nach dem Krakatau-Ausbruche beobachteten atmosphärisch-optischen Störung.** [Research on twilight phenomena with explanation of the atmospheric optical disturbances observed after the Krakatoa eruption.] Hamburg and Leipzig, L. Voss, **1888.** 172 p. 8 figs., 9 color plates (of sunsets), 4 world maps (of spread of dust), tables, refs. **DWB**—Abstract and review in *Meteorologische Zeitschrift*, 6:7–8, **1889.** (Author's earlier papers listed in the Report of the Krakatoa Committee of the Royal Society, 1888, see F–35). Work was simultaneous with but independent of British Committee's. Author considers only the purely optical and meteorological phenomena connected with the eruption. Systematic survey made of extensive observations of the optical disturbances, 1883–1886, as well as a survey of earlier such observations. Considered work of von Bezold of basic importance. Relation of twilight phenomena and volcanic eruptions shown. Maps of various occurrences. Tables of occurrences give picture of upper air layers. Three groups of optical effects delineated: coloring of sun itself (in equatorial region), Bishop's Ring, and intensive twilights. Theories on refraction and particle size included. Geographical spread of the atmospheric disturbances. Physical explanations of observed phenomena. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–34** 551.510.423(923):551.593

**Krakatoa.** *Nature*, [London], 30:279–280, July **1884.** **DLC**—General account of eruption, with section on spread of dust and sunset phenomena as reported at various points about globe. No tabulated data, but brief notations from observers at different points. Typical report at time. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–35** 551.510.423(923):551.513:551.593

†*Krakatoa Committee of the Royal Society of London, Report of the, **The eruption of Krakatoa.** G. J. Symons (ed.) London, Trübner & Co., **1888.** 494 p. 16 figs., 43 plates, extensive tables, over 100 refs., equations. **DLC, DWB**—The most thorough and far-reaching study of the eruption of 1883 and the attending phenomena, including extensive data and reference material. Part I deals with the volcanic phenomena of the eruption and the nature and distribution of the ejected materials, including a table of dates and localities where pumice and volcanic dust were seen in the Indian Ocean in 1883–4. Part II considers the air waves and sounds caused by the eruption. Part III deals with seismic sea waves caused by the eruption. Part IV deals extensively with the unusual optical phenomena of the atmosphere 1883–6, including twilight effects, coronal appearances, sky haze, colored suns, moons, etc., and includes a general list of dates of first appearances of the phenomena and their general geographical distribution as well as velocity of translation of smoke stream; connection between propagation of sky-haze and optical phenomena and the general circulation of atmosphere, spread of phenomena with maps, diurnal and secular variations in glows and height of stratum which caused them; lists and discussion of previous analogous glow phenomena and corresponding eruptions; individual opinions and hypotheses to account for the abnormal optical phenomena; and finally an analysis of connection between meteorological phenomena of 1883–6 and the eruptions of Krakatoa in May and August, 1883, including discussion of various objections; diagram of atmospheric circulation; and summary of evidence in favor of the connection of all optical phenomena with the eruptions of Krakatoa. Part V reports on the magnetical and electrical phenomena accompanying the Krakatoa explosion. A review of the Report of the Committee, section on optical phenomena, appears in *Royal Meteorological Society, Quarterly Journal*, 14:301–307, **1888.** *Subject Headings:* **Volcanic dust, Optical phenomena, Atmospheric circulation, Krakatoa.**

**F–36** 551.510.423(923):551.593

Meeson, John, **On the recent sun-glows and the theories that have been advanced to account for them.** *New Zealand Institute, Transactions and Proceedings*, 17:357–386, **1885.** (Excerpt.) **DWB**—Broad, general description and analysis with little actual data. Cosmic dust, aqueous vapor, volcanic theories, outlined. *Subject Headings:* **Optical phenomena, Volcanic dust, Krakatoa.**

**F–37** 551.510.423(923):551.593

*Neumayer, G., **Bericht über die vulkanischen Ausbrüche des Jahres 1883 in ihrer Wirkung auf die Atmosphäre.** [Report on the volcanic eruption of the year 1883 and its effects on the atmosphere.] *Meteorologische Zeitschrift*, 1:1–4, 49–65, 156–163, 181–198, 277–282, 311–319, **1884. DWB**—Lengthy series of reports. Detailed daily observations of twilight phenomena after Krakatoa eruption, kept at different points in the world. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–38** 551.510.423(923):551.513:551.593

Pernter, J. M., **Der Krakatau-Ausbruch und seine Folgeerscheinungen.** [The eruption of Krakatoa and subsequent phenomena.] *Meteorologische Zeitschrift*, 6:329–339, 409–418, 447–466,

**1889.** tables, maps opposite p. [96], refs., equations. **DWB**—A review in German of the Report of the Krakatoa Committee of the Royal Society, 1888. Original maps in series by days show the spread of the dust clouds around the earth for two weeks after eruption. *Subject Headings:* **Volcanic dust, Atmospheric circulation, Optical phenomena, Krakatoa.**

**F–39** 551.593:551.510.423(923)(729)

Pernter, J. M., **Meteorologische Optik.** [Meteorological optics.] Vienna, W. Braumüller, **1902, 1910.** 799 p. 224 figs., tables, refs., equations. **DLC, DWB**—Discussion of Bishop's Ring after Krakatoa, p. 469–471. Description of sunsets in the 1883–1886 period of atmospheric turbidity after Krakatoa, p. 769–776. Observations in 1902–1904 period after Pelée, p. 776. *Subject Headings:* **Optical phenomena, Volcanic dust, Krakatoa, Pelée.**

**F–40** 551.510.423(923)

**Les premières nouvelles concernant l'éruption du Krakatau en 1883 dans les journaux de l'Insulinde.** [First news of the eruption of Krakatoa in 1883 from the newspapers of the Indies.] **DLC**—A collection of 42 brief, condensed newspaper reports at the immediate time of the eruption, translated into French. Notes pertain to such questions as the distance the eruption was heard, in what regions the level of the sea was affected, and farthest points which recorded the cloud of dust carried along by atmospheric movements. Reports are included from India, Persian Gulf region, Ceylon, Mauritius, Sumatra, Java, Moluccas, Borneo, Siam, North America, South America, Japan, Philippines, Singapore, Australia. *Subject Headings:* **Volcanic dust, Krakatoa.**

**F–41** 551.510.423(923):551.593.55

**The remarkable sunsets.** *Nature*, [London], 29:250–252, 259–260, Jan. **1884. DLC**—Descriptive communications of sunset phenomena in Jan. 1884, from different parts of world, mainly England and Europe. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–42** 551.510.423(923):551.593.55

Ringwood, William, **Red sunsets.** *New Zealand Institute, Transactions and Proceedings*, 17:386–397, **1885.** fig., 2 tables, (Excerpt). **DWB**—Detailed analysis of spread of Krakatoa dust about the earth. Tables show mean diurnal velocity in miles of the phenomena of colored suns and brilliant sunsets, 1) in the Northern Hemisphere, 2) in the Southern Hemisphere. Diagram shows equatorial velocity of the earth per hour. References given to earlier occurrences of optical phenomena due to volcanic eruptions, including one from Virgil. *Subject Headings:* **Volcanic dust, Optical phenomena, History, Krakatoa.**

**F–43** 551.510.423(923):551.593.55

Stentzel, Arthur, **Vulkanische Dämmerungserscheinungen.** [Volcanic twilight phenomena.] *Das Wetter*, 19:156–162, **1902.** table, refs. **DWB**—Table gives dates of occurrences of sunset phenomena in Germany in 1883, 1884, and 1885, with degree of intensity noted. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–44** 551.510.423(923)

Sturdy, E. W., **Volcanic eruption of Krakatoa, 1883.** *Atlantic Monthly*, 54: 385–391, **1884. DLC**—General account of the eruption including the descriptive report which was given the San Francisco Hydrographic Office by Capt. Watson of the British ship, Charles Bal, which was in the near vicinity during the eruption. Only brief mention of the airwaves and propagation of dust over the globe. *Subject Headings:* **Volcanic dust, Krakatoa.**

**F–45** 551.510.423(923):551.593.55

Upton, W., **The red skies.** *Science*, 3:37–40, Jan. 11, **1884.** table. **DLC**—Account of phenomena given. Small table classifies the dates at which the atmospheric phenomena were earliest observed in 26 different countries. Data derived mainly from English periodicals and from records of the U. S. Signal Service. *Subject Headings:* **Volcanic dust, Optical phenomena, Krakatoa.**

**F–46** 551.510.423(923)

Verbeek, R. D. M., **Kort Verslag over de Uitbarsting van Krakatau op 26, 27 en 28 Augustus 1883.** [Report on the eruption of Krakatoa, Aug. 26, 27, 28, 1883.] Batavia, Landsdrukkerij, **1884.** 23 p. table. **DLC**—Translated in *Nature*, [London], 30:10–15, **1884. DLC**—Precursor of more complete report of 1885. No tabulated data. *Subject Headings:* **Volcanic dust, Krakatoa.**

**F–47** 551.510.423(923):551.593:551.513

*Verbeek, Rogier Diederik Marius, **Krakatau.** [Krakatoa.] Batavia, State Printer, **1885.** 567 p. tables, refs. (In French.) **DLC**—Contains analytical table of contents. Lengthy, detailed

work, covering some of the history of the volcano and lesser eruptions prior to Aug. 26, 1883, causes of the famous eruption, phenomena which accompanied it such as, earthquakes, ejected material, geology of Krakatoa, magnetic and meteorological phenomena, including extensive observations of transport of dust around the earth, colored sunsets, effects on temperature in Java, and many other significant effects. *Subject Headings:* **Volcanic dust, Atmospheric circulation, Optical phenomena, Krakatoa.**

## COTOPAXI, 1884

**F–48** 551.510.423(86):551.513

Whymper, Edward, **Colored skies after an eruption of Cotopaxi.** *Science*, 3:99–100, Jan. 25, **1884.** ref. **DLC**—A column of black smoke was observed to ascend from the volcano Cotopaxi, Equador, to an estimated height of 40,000 ft.; its spread was watched first west and then south, rapidly, indicating winds at that altitude. The very fine dust caused solar color phenomena, but fell soon afterwards. *Subject Headings:* **Volcanic dust, Atmospheric circulation, Cotopaxi, Equador.**

## PELÉE, 1902

**F–49** 551.510.423(729):551.593

Backhouse, T. W., **Volcanic dust phenomena.** *Nature*, [London], 67:174, **1902. DLC**—Letter to the Editor. Describes sunset and corona phenomena in fall and early winter of 1902 in England with reference to volcanic dust from Pelée. *Subject Headings:* **Volcanic dust, Optical phenomena, Pelée.**

**F–50** 551.510.423(729):551.593

Backhouse, T. W., **Volcanic dust, the "new bishop's ring" and atmospheric absorption.** *Nature*, [London], 69:81, **1903. DLC**—Letter to Editor. Describes optical phenomena as visible in 1903 in England and attributes them to volcanic sources (Pelée with reference to Krakatoa as well). *Subject Headings:* **Volcanic dust, Optical phenomena, Pelée, Krakatoa.**

**F–51** 551.510.423(729):551.593

Gruner, P., **Über die neueren Dämmerungserscheinungen.** [On the new twilight phenomena.] *Naturforschende Gesellschaft, Bern, Mitteilungen*, **1903.** 5 p. 6 refs. (Reprint available.) **DWB**—Observations of optical phenomena after Mount Pelée eruption, 1902. No tables, but observations reported in a series by days, Dec. 1902, through Feb. 5, 1903. *Subject Headings:* **Volcanic dust, Optical phenomena, Pelée.**

**F–52** 551.510.423(729):551.593

Heilprin, Angelo, **The eruption of Pelée; a summary and discussion of the phenomena and their sequels.** Philadelphia, J. B. Lippincott, **1908.** 72 p. 43 plates, refs. **DLC**—Extensive discussion of the eruption and aftermath, p. 46–56. Afterglows. Bishop's Ring, diminution in intensity of solar radiation, general optical phenomena. Author discusses and summarizes these phenomena after the Pelée disaster. *Subject Headings:* **Volcanic dust, Optical phenomena, Pelée.**

**F–53** 551.510.423(729):551.593.55

Marchand, E., **Les lueurs crépusculaires et phénomènes connexes observés en 1902, 1903–1904 dans les Pyrénées.** [The brilliant sunsets and related phenomena observed in 1902, 1903–1904 in the Pyrenees.] *Société Météorologique de France, Annuaire*, 53:40–45, **1905. DWB**—Sunset phenomena, solar and lunar coronas, and low solar radiation noted in connection with 1902 eruption of Pelée. No tabulated data. *Subject Headings:* **Volcanic dust, Optical phenomena, Pelée.**

## KATMAI, 1912

**F–54** 551.510.423(798):551.593.54

Clark, J. Edmund, **Effect upon atmospheric transparency of the Alaskan eruption.** *Royal Meteorological Society, Quarterly Journal*, 39:219–220, **1913. DWB**—Brief notation of others' observations of optical phenomena and dust clouds. *Subject Headings:* **Volcanic dust, Optical phenomena, Katmai.**

**F–55** 551.510.423(798):551.593

*Dorno, C[arl Wilhelm Max], **Beobachtungen der Dämmerung und von Ringerscheinungen um die Sonne 1911 bis 1917.** [Observations on twilight and ring phenomena of the sun 1911 to 1917.] Berlin, *K. Preussiche Meteorologische Institut, Veröffentlichungen*, 5, No. 5, **1917.** 94 p. tables, refs. **DWB**—Extensive observations kept and analysis made for this period before and after Katmai eruption. *Subject Headings:* **Volcanic dust, Optical phenomena, Katmai.**

F–56 550.510.423(798):551.593.55

Galli, Ignazio, **La colorazioni crepuscolari del 1913–14.** [The colorful sunsets of 1913-14.] *Estratta dagli Atti della Pontificia Accademia Romana dei Nuovi Lincei*, 67, Session 3a, Feb. 15, **1914.** 5 p. (Reprint available.) **DWB**—*Subject Headings:* **Volcanic dust, Optical phenomena, Katmai.**

F–57 551.510.423(798):551.583

†Griggs, Robert F., **Climatic effects of the eruption.** Chap. IV. (In his **The valley of ten thousand smokes.** Washington, D. C., *National Geographic Society*, **1922.** p. 32–44. figs., maps, tables, refs.) **DLC**—The effect of the volcanic dust in the atmosphere from the volcanic eruption of Katmai, 1921, on the climate over the world is analyzed with some data and graphs, given. Table shows diminished heating power of sunlight due to the dust from Katmai. Other volcanic eruptions. Krakatoa, Iceland, etc. are briefly mentioned. *Subject Headings:* **Volcanic dust, Climatic variations, Katmai.**

F–58 551.510.423(798):551.593:551.521.1

Jensen, Chr., **Über die grosse atmosphärisch-optische Störung von 1912.** [On the great atmospheric optical disturbances of 1912.] *Vereinigung von Freunden der Astronomie und kosmischen Physik, Mitteilungen*, **1913.** 12 p. 2 tables, refs. (Reprint available.) **DWB**—Mathematical analysis of atmospheric dust condition after Katmai eruption. Theories of optical phenomena of atmosphere. Polarization measured. Tables give observations of Arago and Babinet points. *Subject Headings:* **Volcanic dust, Solar radiation, Arago's point, Katmai.**

F–59 551.510.423(798):551.521.1

*Jensen, Chr., **Die neutralen Punkte von Arago und Babinet in Hamburg und an einigen anderen Orten.** [Arago and Babinet neutral points in Hamburg and several other places.] *Jahrbuch der hamburgischen wissenschaftlichen Anstalten*, Vol. 33, 3. Beiheft, 1915. Hamburg, **1916.** 80 p. 8 figs., 8 tables, numerous refs. **DWB**—Discussion of atmospheric polarization. Observations made in Hamburg during period from 1911 to 1914. Definite effects of the Katmai eruption are evident. *Subject Headings:* **Volcanic dust, Solar radiation, Arago's point, Katmai.**

F–60 551.510.423(798):551.593.54:551.521.1

Kimball, Herbert H., **The dense haze of June 10–11 1912.** *Mount Weather Observatory, Bulletin*, 5:161–165, **1912–1913.** 3 tables. **DWB**—Optical phenomena caused by a smoke-like haze in upper atmosphere are described. Tables give radiation and polarization data. Brief mention that Alaska volcanoes may be responsible. *Subject Headings:* **Volcanic dust, Optical phenomena, Solar radiation, Katmai.**

F–61 551.510.423(798):551.521.1

*Kimball, Herbert H., **The effect of the atmospheric turbidity of 1912 on solar radiation intensities and skylight polarization.** *Mount Weather Observatory, Bulletin*, 5:295–312, **1913.** fig., 6 tables, refs. **DWB**—Study of effect of haziness upon solar radiation intensities and skylight polarization. This condition, reputed to be caused by Katmai eruption, is briefly compared with radiation conditions after Krakatoa, Pelée, and other eruptions. *Subject Headings:* **Volcanic dust, Optical phenomena, Solar radiation, Katmai.**

F–62 551.510.423(798):551.521.1:551.593.54

†*Kimball, Herbert H., **The effect upon atmospheric transparency of the eruption of Katmai volcano.** *Monthly Weather Review*, 41:153–159, **1913.** chart, 3 tables, 16 refs. **DWB**—Eruption of June 6, 1912, described: detonations, fall of volcanic ash, haze and smoke. Analysis of spread of volcanic dust. Tables give sky polarization and radiation data, and atmospheric transparency estimates. Reports are collected from various observatories over the U. S. Atmospheric turbidity in Europe in 1912, briefly treated; effects not observed there until June 19–25. Twilight phenomena noted as well as decrease in atmospheric transparency. *Subject Headings:* **Volcanic dust, Solar radiation, Katmai.**

F–63 551.510.423(798):551.521.1:551.524

†*Kimball, H. H., **The relation between solar radiation intensities and temperatures of the air in the Northern Hemisphere in 1912–1913.** *Mount Weather Observatory, Bulletin*, 6:205–220, **1914.** fig., 7 tables, 15 refs. **DWB**—Detailed observations kept in period after Katmai. Chart shows polarization, insolation, and temperature curves for 1912–1913. *Subject Headings:* **Volcanic dust, Solar radiation, Air temperature variations, Katmai.**

F–64 551.510.423(798):551.521.1:551.593:551.513

*Maurer, J. and Dorno, C., **Über den Verlauf und die geographische Verbreitung der atmosphärisch-optischen Störung 1912–1913.** [On the course and geographical distribution of the

atmospheric optical disturbance of 1912–1913.] *Meteorologische Zeitschrift*, 31:49–62, **1914.** fig., 4 tables, refs. **DWB**—Thorough observations kept, tabulated and analyzed. Graph shows variations in actinometrical and optical elements in the turbidity period of 1912. Tables show geographical distribution of optical phenomena with dates and intensities, radiation, Arago's point, Babinet's point, and air electricity measurements. *Subject Headings:* **Volcanic dust, Optical phenomena, Arago's point, Solar radiation, Atmospheric circulation, Katmai.**

## SUPPLEMENTARY MATERIAL

**F–65** 551.510.423:551.542(4)

Brooks, C. E. P. and Hunt, T. M., **The influence of explosive volcanic eruptions on the subsequent pressure distribution over western Europe.** *Meteorological Magazine*, [London], 64(766): 226–229, Nov. 1929. **DLC**—*Subject Headings:* **Volcanic dust, Atmospheric circulation, Western Europe.**

**F–66** 551.510.423:551.513(261)

Defant, A., **Die Schwankungen der atmosphärischen Zirkulation über dem Nordatlantischen Ozean im 25-jährigen Zeitraum 1881–1905.** [The fluctuations of the atmospheric circulation over the North Atlantic Ocean in the 25-year period 1881–1905.] *Geografiska Annaler*, 6:13–41, **1924. DLC**—The circulation measured by the pressure difference between low and high latitudes is greatly decreased in the year of an eruption, but increased in the following years. *Subject Headings:* **Volcanic dust, Atmospheric circulation, North Atlantic.**—*C.E.P.B.*

# PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

**Note:** The contents of periodicals included in this section, are for information only, and will not be listed in either the author or subject indexes. When material is furnished in advance of date of publication, the pagination may be omitted.

**American Meteorological Society, Bulletin,** Volume 31, Number 5, May 1950.

Vonnegut, Bernard: **Experiments with silver iodide smokes in the natural atmosphere,** p. 151–157.

Berkofsky, Louis: **An objective determination of probability of fog ormation,** p. 158–162.

Brooks, Charles F. and Schell, Irving I.: **Heavy snowstorms at Blue Hill (Boston), Mass. II. Pressure, wind and temperature on Mt. Washington during the 24 hours prior to the onset of heavy snow at Blue Hill,** p. 163–167.

Yerg, Donald G.: **The importance of water vapor in microwave propagation at temperatures below freezing,** p. 175–177.

Bunker, Andrew F.: **Fluctuations of the vertical component of the wind associated with the outflow of cold air from a thunderstorm,** p. 178–180.

Carlin, Albert V.: **Photographic measurement of amount of cloudiness in the sky,** p. 180–183.

**Archiv für Meteorologie, Geophysik und Bioklimatologie, Serie A,** Volume 2, Number 2–3, 1950.

Montgomery, R. B.: **The Taylor diagram (temperature against vapor pressure) for air mixtures,** p. 163–183.

Defant, F.: **Das mittlere meridionale Temperaturprofil in der Troposphäre als Effekt von vertikalen und horizontalen Austauschvorgängen und Kondensationswärme,** [The mean meridional temperature profile in troposphere as an effect of vertical and horizontal "Austausch" processes and heat of condensation], p. 184–206.

Raethjen, P.: **Über die gegenseitige Adaptation der Druck- und Stromfelder,** [On the opposing adaptation of pressure and flow fields], p. 207–222.

Dedecker, P.: **Sur les équations approchées de la dynamique atmosphérique,** [On the approximate equations of atmospheric dynamics], p. 223–238.

Hoinkes, H.: **Die interdiurnen Änderungen von Druck und Temperatur in der unteren Troposphäre bis 5 km Höhe und ihre gegenseitigen Beziehungen in statistisch-synoptischer Betrachtungsweise,** [The interdiurnal variations of pressure and temperature in the lower troposphere up to 5 km. and their contrasting relations from a statistic-synoptic viewpoint], p. 239–304.

Dési, F.: **Über das Gleichgewicht eines gesättigten Luftteilchens,** [On equilibrium of a saturated particle of air], p. 305–307.

Burkard, O.: **Thermische Aufspaltung ionosphärischer Schichten,** [Thermal separation of ionospheric layers], p. 308–314.

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Ice
Ocean currents
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Physical oceanography
Polar ice
Salinity
Viscosity of sea water

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